The RUBBER AGE

November, 1943

TECHNOLOGY DEPT.

NOV 29 1943

REOGEN

REOGEN is used to good advantage in GR-S to improve mixing, calendering and tubing.

Try 5 to 10 parts on the rubber in straight GR-S stocks or in GR-S—Reclaim combinations.

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

Newsletter No. 11
NOVEMBER, 1943
Published by Rubber Chemicals Division of DU PONT

NEOPRENE MAKES GOOD CEMENTS

NEOPRENE TYPES GN (or GR-M), CG and KNR especially are recommended for cements for spreading on fabric, dipped goods, adhesives and protective coatings for wood, metal and other materials. These types and their compounds are readily soluble in selected solvents and handle exceptionally well as cements.

CHOICE OF SOLVENTS—The neoprenes are not soluble in petroleum products. They are soluble in aromatic and chlorinated hydrocarbons, some esters and ketones. Although gasoline and other petroleum products are not neoprene solvents they may be used in substantial amounts to dilute true solvents in making neoprene cements. Perhaps the most widely used neoprene solvents are the well known blends of petroleum and naphthenic materials in which the naphthenic or aromatic constituents are about 30% of the total. Blends of benzol or toluol and gasoline in ratios of 50:50 or 40:60 are entirely practical. It is not desirable in making a neoprene cement to add gasoline to a commercially blended solvent which contains a petroleum because the ratio of solvent to non-solvent may become unbalanced and cause the neoprene to precipitate or the cement to layer.

VISCOSITY OF NEOPRENE CEMENTS—Neoprene cements at a given concentration of solids are lower in viscosity than rubber cements. This fact permits the use of cements having relatively high solids per unit of viscosity and means that less solvent may be used to maintain a given viscosity than is the case with rubber cements.

As would be expected, a solution of neoprene that is unmilled or merely creped through a cold mill is much higher in viscosity than a solution made from well broken down neoprene. When milled long enough, neoprene reaches an approximately constant plasticity and hence a reasonably constant viscosity when put into solution. To obtain cements of constant viscosity for a given solids content, it is well to mill the elastomer until the plasticity no longer drops noticeably.

The viscosities of solutions of well milled Neoprene Types GN and CG are very close. Type KNR, whether milled a little or considerably, gives solutions that are substantially less viscous than similar solutions made from Types GN and CG.

NEOPRENE TYPE CG FOR ADHESIVE CEMENTS—Type CG is definitely outstanding for adhesive cements because of its characteristic freezing or setting at room temperature which results in cement bonds being much stronger immediately after forming than if other types of neoprene are used. When well cured, at elevated temperatures or with the addition of accelerators at room temperature, there is little difference in ultimate bond strength between CG and GN. Initial bond strength is very desirable in all adhesive applications. Bonds made from Type KNR cements are much weaker than those from CG or GN cements until they are well cured. Type KNR films do, however, retain their tack longest after solvent evaporation, with GN films next and CG films last. Type CG cement films are tacky only as long as solvent is present, as they become very dry as well as hard at room temperature when solvent-free. The tack retention period of CG cement films can be increased as desired, however, by the addition to the cements of small amounts of high boiling solvents or by adding suitable tackifiers.

SURFACES TO WHICH NEOPRENE ADHERES—Neoprene, like rubber, has a characteristic tackiness that makes it stick to itself easily and to a very wide variety of other materials, such as raw and vulcanized rubber, GR-S and Thiokol as well as to leather, fabric, wood and metal. It adheres moderately to glass and some of the clear resins but like rubber can be peeled from such surfaces when dry. It does not stick to vinylite and butyral surfaces sufficiently well to be considered a suitable adhesive for them.

While neoprene cements differ from rubber cements, they may be made to serve fully as well and often much better in many respects due to the inherent resistance of neoprene to oxidation, sunlight, oils and chemicals.

NEOPRENE TYPE GN (or GR-M)—This type of neoprene is recommended especially for spreading and dipping cements. It provides films having the same good properties that are found when neoprene is used on a conventional dry basis. For spreading cements the solids content ranges from 35% for fine, minimum weight coatings to 60% for normal handling doughs. Dipping cements containing 25% solids handle well.

NEOPRENE TYPE KNR—This neoprene becomes very soft and tacky when milled and is capable of being plasticized to an almost fluid state. It is possible, therefore, to compound it with very large amounts of filler and still have workable stocks and to make practical cements with exceedingly small amounts of solvent. Cements from well loaded KNR stocks containing as high as 85% solids can be handled easily with a trowel and are suitable for application as caulking and coating compounds.

NEOPRENE LATEX TYPE 571—It should not be overlooked that neoprene latex adhesives are excellent for most applications where rubber latex was previously used. Neoprene latex bonds are strong and resistant to oxidation and other conditions encountered in service. The latex can be easily compounded with zinc oxide, Neozone D and plasticizing chemicals which are essential to good life and performance as an adhesive.

BACK THE ATTACK
WITH WAR BONDS

DU PONT
RUBBER CHEMICALS DIVISION
BETTER THINGS FOR BETTER LIVING . . . Through Chemistry

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The stratosphere comes down to earth

It's cold inside this box—as cold as any part of the stratosphere man has yet visited . . . and here is where samples of Hycar destined for use in our highest-flying bombers and fighters are tested for low-temperature flexibility.

We believe it sound to subject our products to the most severe conditions they will ever encounter in actual service. That's why they're tested in the Hycar Customer Service Laboratory... so that we and you can be sure.

The cold-box is just one of the many facilities of this complete, fully-staffed laboratory devoted entirely to customer problems. We will welcome the opportunity of cooperating with you. *Hycar Chemical Co., Akron 8, Ohio.*

LIMITED QUANTITIES OF HYCAR are now available for experimental purposes without WPB allocations. Individual orders may not exceed 25 pounds per month.

Hycar

LARGEST PRIVATE PRODUCER OF BUTADIENE

Synthetic Rubber

Three FACTS TO REMEMBER

about TITANOX Pigments

1 Titanium dioxide, of which TITANOX pigments are the oldest representatives, is the most efficient whitening agent for natural, reclaimed and synthetic rubber.

2 Titanium dioxide, of which TITANOX pigments are the most widely used, is one of the best non-black rubber reinforcing pigments.

3 TITANOX pigments have been improved to the point of highest opacity, whiteness and brightness among opaque white pigments.

We will gladly cooperate with technical men in the tire and rubber fields in matters involving the use of white pigments.

TITANIUM PIGMENT CORPORATION *Sole Sales Agent*
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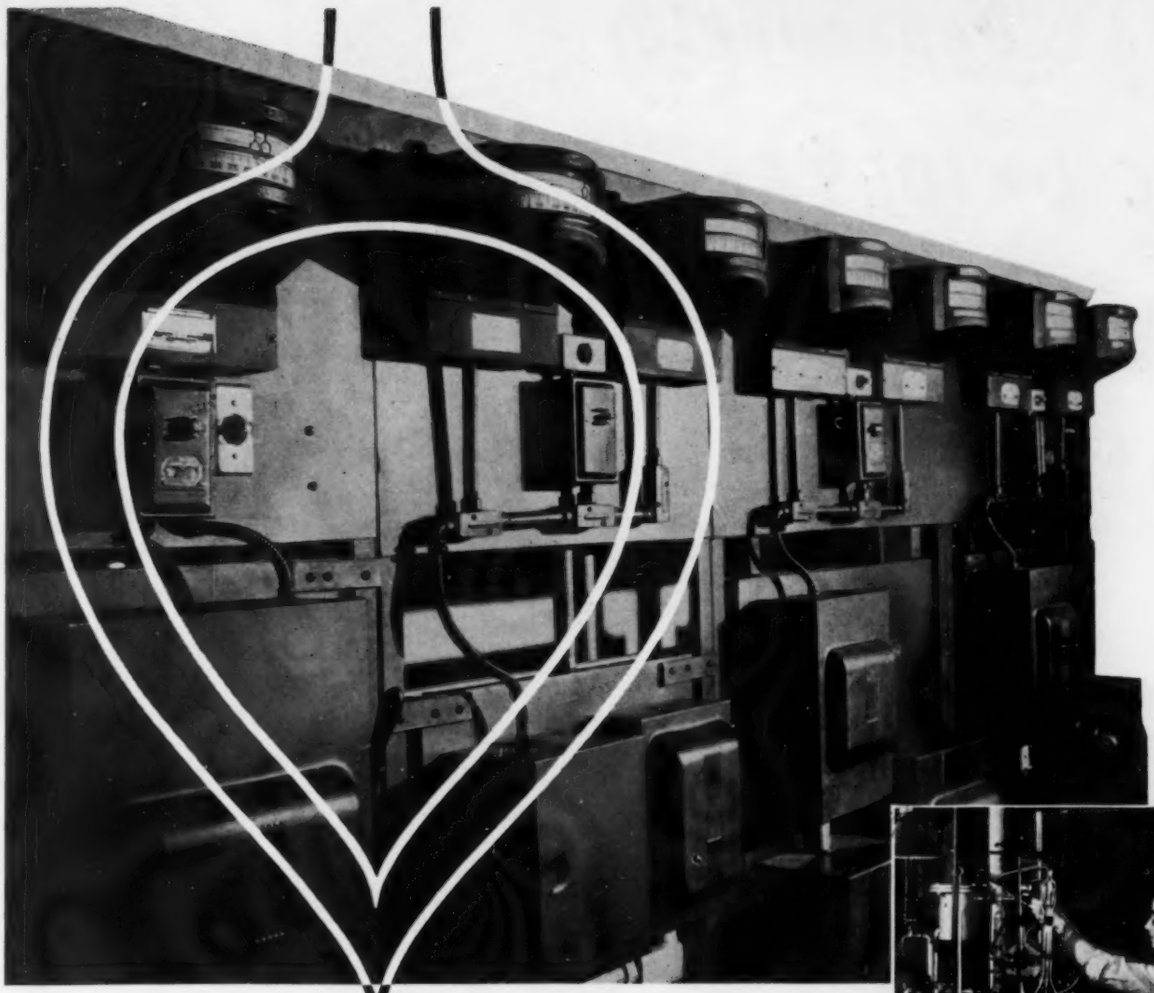
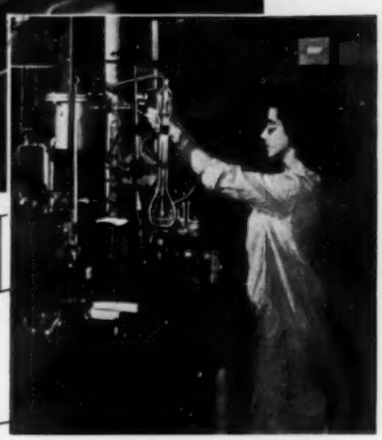
TITANOX
TRADE MARK





CONSTANT CONTROL

assures the Purity and Uniformity of NAFTOLEN

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We know that the quality of *your* product depends upon the quality of *our* product. Therefore, from raw material to finished product, constant control is maintained. There is no room for guesswork. In the plant and in the laboratory, NAFTOLEN is checked and tested again and again to insure its purity and uniformity.

You can rely on NAFTOLEN to give you uniform results—not only today—but also tomorrow.

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10 East 40th Street — **New York 16, N. Y.**

Plant and Laboratory: — *Wilmington, Delaware*

W C=C

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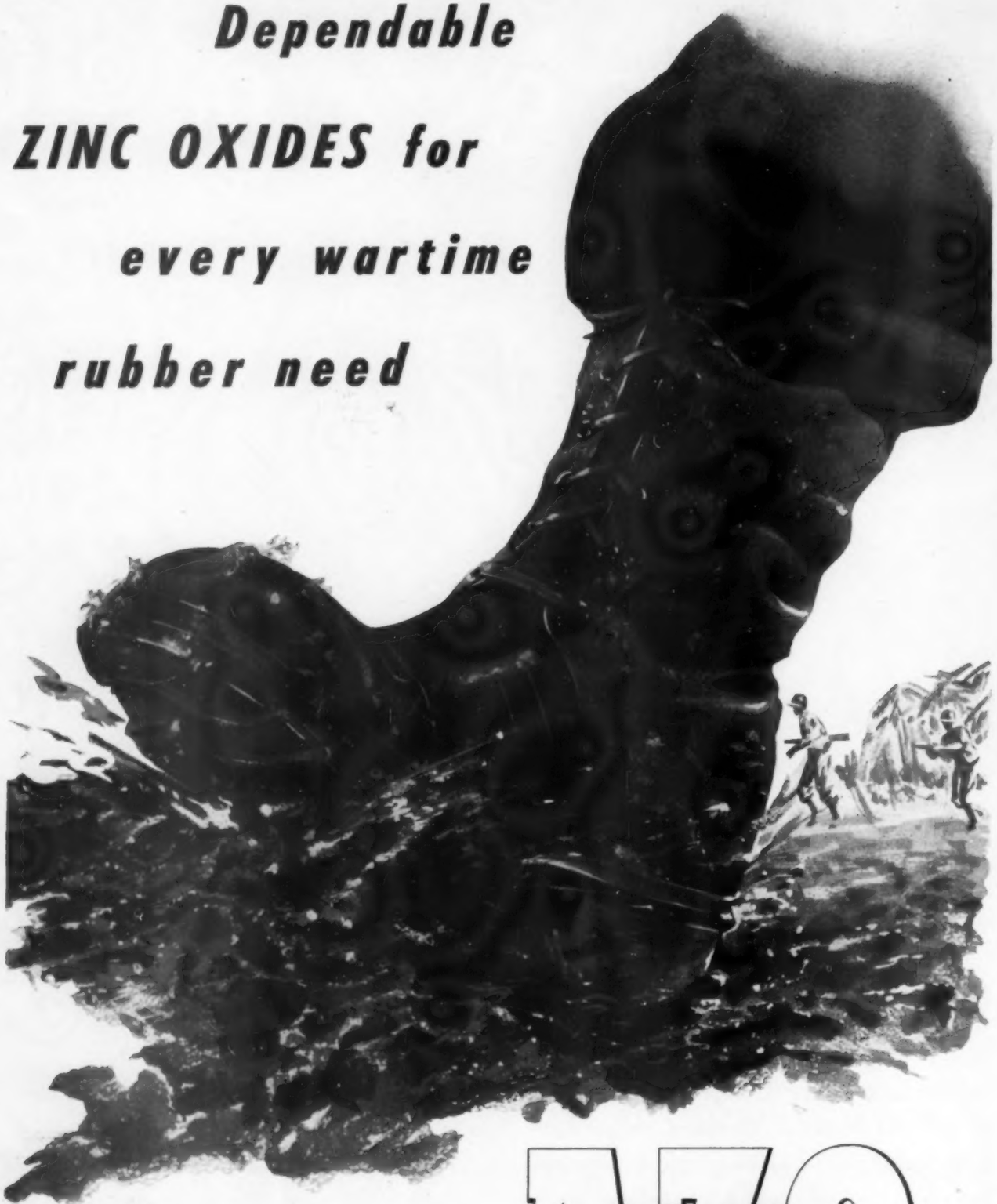
Dependable ZINC OXIDES for every wartime rubber need



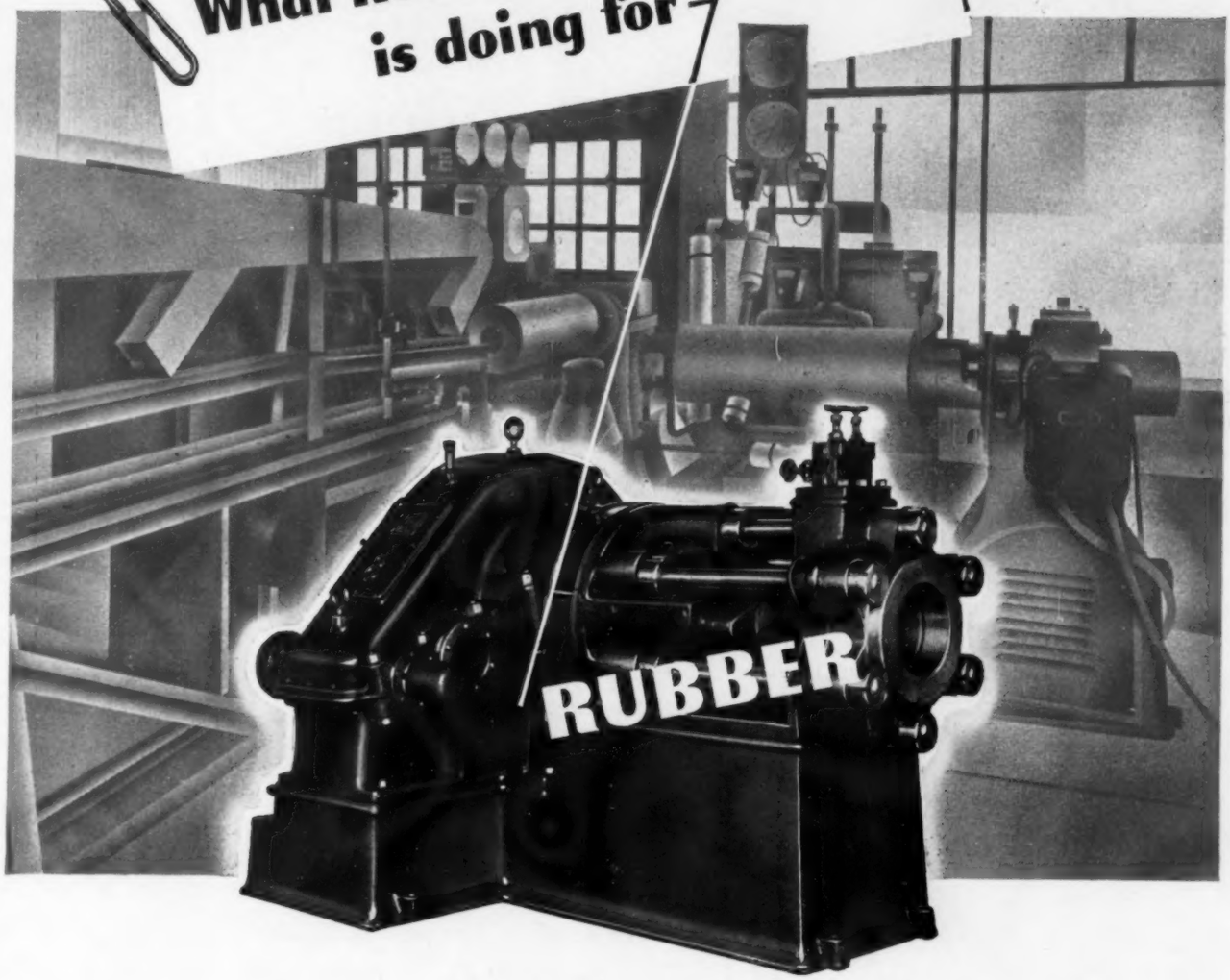
AZO

ZINC OXIDES

AMERICAN ZINC SALES CO., Distributors for AMERICAN ZINC, LEAD & SMELTING CO.

COLUMBUS, OHIO - CHICAGO - ST. LOUIS - NEW YORK

What Research in Plastics is doing for RUBBER



HERE at National we have been doing a good deal with plastics the past few years. It is perfectly natural that we should. Within limits, the handling and processing of plastic materials is much like that of natural rubber, and the similarity to synthetic rubber is striking. You might call them sister industries.

At any rate, we found our years of experience designing and building rubber machinery immensely helpful in developing a complete line of plastics extruders and auxiliary equipment. Today there are more National plastics extruders in operation than all other makes combined.

What does that mean to the rubber industry? Here is an example:

Extensive development work in plastics now has enabled us to bring about major advances in rubber extruders. Characteristics of the screw, heat transfer, the type of drive —these are just a few of the factors which have been profoundly affected. They add up, however, to more pounds per hour at lower working temperatures, for synthetic as well as natural stocks.

To rubber fabricators this means performance. To us it means progress and the opportunity to serve you better than ever before. Our engineers are ready to help solve individual problems.

NATIONAL RUBBER MACHINERY COMPANY

General Offices: Akron 11, Ohio

CREATIVE ENGINEERING

ARMY NAVY

CLIFTON DIVISION

Something Worth Remembering

Anything which helps to save time and materials today is certainly *worth remembering* and *using*—and that fits the CAPITOL PROCESS OF LINER TREATMENT to a "T". This is the economical and efficient process which helps prevent adhesion of rubber to liners and aids in prolonging the life of cotton fabrics. Capitol Treated Liners have already proved their value in a large number of rubber plants. If you have not tried this process yet, SEND US A 50—OR 100 YARD LINER AND WE WILL TREAT IT WITHOUT CHARGE so you may test it in your own plant. Write today for full particulars.

★

TEXTILE PROOFERS, INC.

181-193 Culver Ave. Jersey City 5, N. J.

Originators of the Capitol *Process Liner Treatment*

Introducing—

Bunatak*

*TRADE MARK, MALREX CHEMICAL CO.

PLASTICIZERS and TACKIFIERS For GR-S Compounds

After many months of research we have developed a complete line of Plasticizers and Tackifiers to fill the needs of the rubber industry for milling and processing GR-S rubber.

These materials, called the BUNATAKS, are available in various types to meet all requirements and can be effectively used in percentages up to 30% on the GR-S as against the usual 50% to 100%.

BUNATAK Plasticizers and Tackifiers have excellent dispersing qualities, softness, varying degrees of building tack, abrasion resistance and produce rubber-like snappy cured stocks of high physical properties. They have performed excellently under practical plant production and are being used in quantity in the compounding of GR-S for footwear and molded goods.

We invite inquiries on any special problems which you may encounter in the compounding and processing of GR-S.

★

Manufactured by Malrex Chemical Company

CHART SHOWING COMPARATIVE PROPERTIES OF BUNATAKS

BUNATAK	Specific Gravity 15.5° C	Loss at 105° C — 16 hrs	Acid Value	Ash	Iodine Value	Color	Nature of Material	Properties	Tack
X	1.013	1.62%	1.06	0.21%	38	Light Brown	Viscous Liquid	Plasticizer Tackifier	High
F	0.944	3.35%	4.35	3.60%	36	Black	Viscous Liquid	Plasticizer Tackifier	Low
J - T	1.008	3.40%	8.33	0.66%	117	Light Brown	Viscous Liquid	Plasticizer Tackifier	Low
U	0.976	4.80%	1.41	0.15%	45	Light Brown	Viscous Liquid	Plasticizer Tackifier	Medium
O	0.928	3.88%	4.04	0.01%	58	Light Brown	Thin Liquid	Plasticizer	None
R	0.935	9.93%	2.80	Nil	42	Light Brown	Thin Liquid	Plasticizer	None
No. 1	0.965	0.96%	0.74	0.27%	38	Yellow Brown	Heavy Soft Paste	Plasticizer Tackifier	High
No. 5	0.948	5.63%	5.03	2.63%	39	Brown	Viscous Liquid	Plasticizer	Medium
A	0.940	2.86%	1.03	6.66%	38	Black	Heavy Soft Paste	Plasticizer Tackifier	Medium

SOLD BY

BUNATAK CHEMICAL COMPANY

227 PLEASANT ST., MALDEN, MASS.

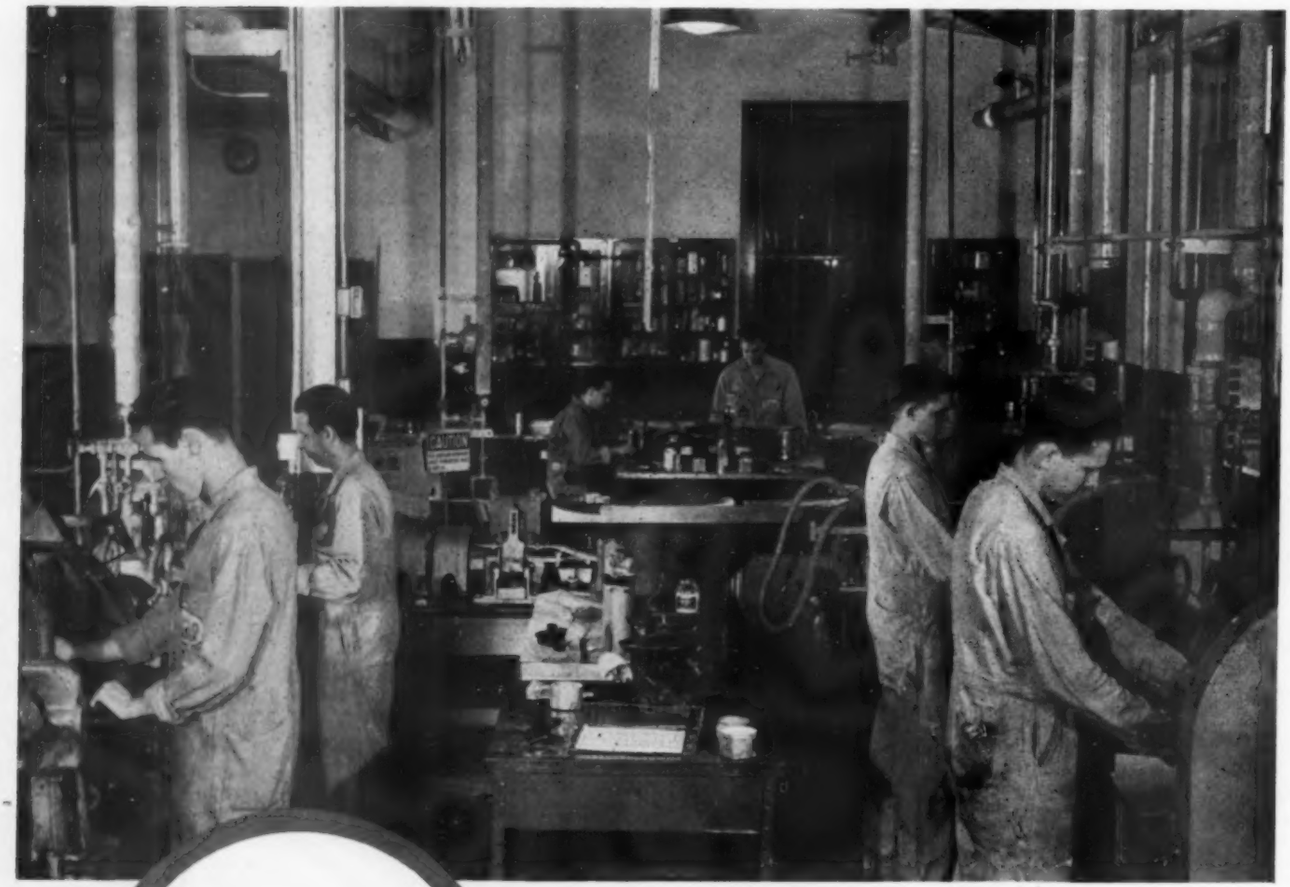
WHEN YOU NEED HELP...

Although a synthetic rubber is in many ways superior to the natural product, its compounding may present problems to the manufacturer experienced only with natural rubber.

Esso Laboratory research scientists know the answers to these problems. They have studied synthetics for years; they know where bugs may develop, and how to overcome them. Already, they have pioneered new methods of using Perbunan, and have worked hand in hand with rubber engineers to put those methods into working practice.

Feel free to call upon us for the help these men and our staff of field technicians can give you, whenever you need it. Remember, these men have made possible a large part of America's oil-base synthetic rubber program.

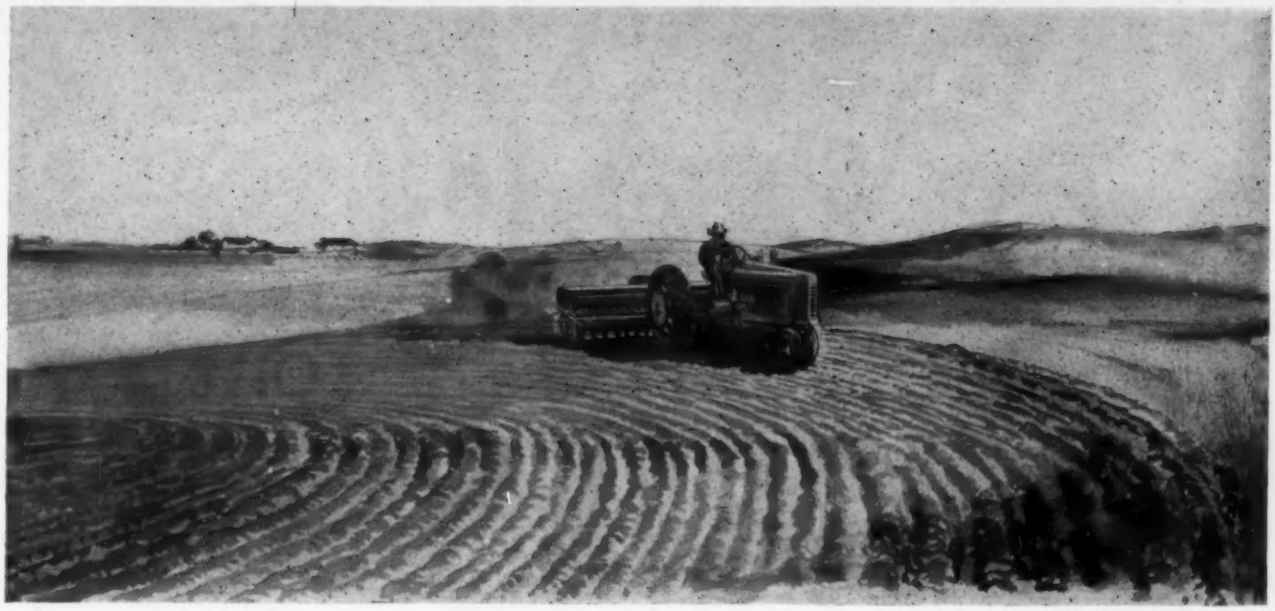
All they know, all they have learned, are yours to use.



PERBUNAN
REG. U.S. PAT. OFF.

...THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT, AND TIME

write STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N.Y.
WAREHOUSE STOCKS IN NEW JERSEY, LOUISIANA AND CALIFORNIA



To provide a legacy of plenty for tomorrow's needs . . .

Today's seeding is the promise of tomorrow's bounty. Ideas are like seeds; they germinate, grow and reach fruition, too, by the nourishing warmth of faith and the moisture of encouragement.

In your laboratories, "seeds" are being sown for tomorrow's legacy of plenty . . . Your research and developments will assure fulfillment of needs as they fruit into production.

But back of the goods you produce for tomorrow's vast requirements is the scrupulous choice of materials . . . That choice must combine assurance of excellence in the performance of the product, ample supply and economy.

. . . RESINEX meets these specifications. It is a resinous thermoplastic extender-plasticizer adaptable to broad uses because of many superior qualities it gives to product performance. Its availability is unrestricted—and there will be plenty for your volume needs tomorrow. It is surprisingly low in cost.

RESINEX has a melting point of 180° F. and a specific gravity of 1.20. It is compatible with all Synthetic, Reclaimed and Natural rubbers.

Test RESINEX in your own laboratory. We will gladly send samples and interesting data we have secured from production runs as well as laboratory tests.

RESINEX

STANDARD *Chemical Company*

GENERAL OFFICE: AKRON (8) OHIO

We have a production problem due to stock adhesions...

★ In the past 20 years, leading rubber companies all over the world have consulted us about their liner problems because they regard us as specialists in liner processing.

These firms have learned that *standardizing* on Climco Processing pays big dividends in better production and lower costs. For Climco Processing insures better separation and eliminates stock adhesions. This puts an end to repairing cut or torn liners, rerolling for cooling, and cleaning to remove lint and ravelings.

By helping prevent gauge distortion, Climco Processing also eliminates rejects that cause loss of rubber in its crude form.

In the interest of greater production efficiency, give Climco Processed liners a trial in your plant.

CLIMCO
CLEVELAND, OHIO, U.S.A.

LINERETTE
INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

THE CLEVELAND LINER & MFG. CO.
CLEVELAND, OHIO

CLIMCO PROCESSED LINERS
FOR FASTER, BETTER PRODUCTION AT LOWER COST

IDENTIFY RUBBER
WAR PRODUCTS WITH

ELASTI-CALS

The Nameplate with COLOR and S-T-R-E-T-C-H

If you require color and high visibility for nameplates, operating instructions, serial numbering, etc.—if you require speed of application and "life of the product" durability—get the full story about Elasti-Cals. Speedily applied in the mold or by cold methods they stretch with . . . and become an edgeless part of the surface to which they are applied.

Meyercord's patented Elasti-Cal process—formerly used for colorful nameplates, trademarks and decorations on a wide variety of civilian rubber products and sundries—is still available . . . BUT FOR WAR PRODUCTION ONLY!

Varying degrees of flexibility are available. Any color or design can be reproduced. Free designing and technical service is available. Reasonable deliveries can be made to duly authorized manufacturers of war products. Samples and complete details on request. Address Department 5611.

Rubber manufacturers interested in Elasti-Cal's endless decorative possibilities for post-war products . . . who even now may be designing against war's end . . . are invited to avail themselves of Meyercord's technical service. Elasti-Cals—the nameplate with color and stretch will be available to ALL for greater post-war profits.

Back the Attack . . . Buy War Bonds

50th Anniversary 1943

ELASTI-CALS SAVE RUBBER

THE MEYERCORD CO.

World's Leading Decalcomania Manufacturer

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BACKING up the quality of rubber products . . . meeting exacting specifications of an industry with exacting needs . . . that is a task to which MT. VERNON fabrics are dedicated. Modern laboratory control guides every step of their production . . . from the careful selection of top grades of cotton, to highly uniform weaving. When you specify MT. VERNON fabrics, you are backing up the quality of your own products.

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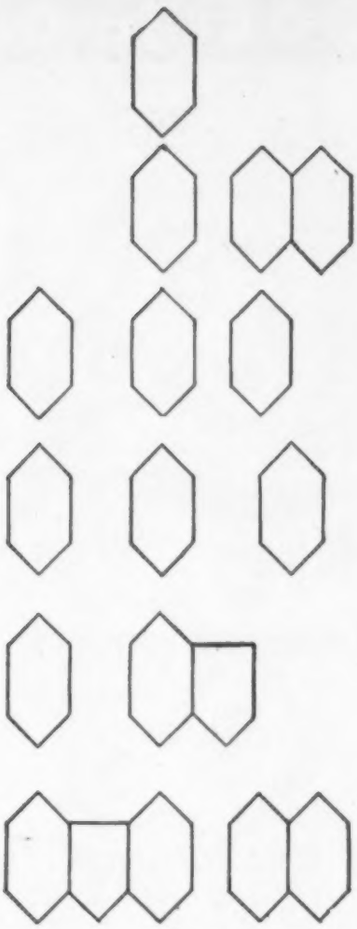
The chemicals that were *"discovered"* at a convention



Four years ago, at the Exposition of Chemical Industries, we put up a trial balloon.

We exhibited a list of 34 chemicals from coal. Some of them were well known commercial chemicals. But others on this list had no sizable known commercial uses. Their general physical and chemical properties were known, but commercially speaking, they were "orphans."

We frankly said *that* about them four years ago; but we also pointed out that the organic chemical industry was growing by leaps and bounds, that it needed things it had never needed before, that other chemicals derived from coal had proven important raw materials for the chemical industry, and that perhaps one of the "orphans" in the Koppers' booth might be exactly the thing for which some chemist was cudgeling his brains.

Since then we have sent out literally thousands of samples of those chemicals. We have worked with many men who saw some promise in them.

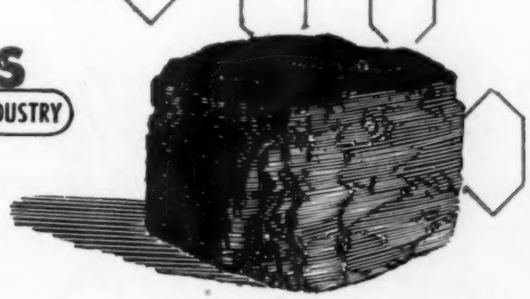
Today, several of them are in commercial production, and new plants have been built to recover them.

In early December, this year, the current Exposition of the Chemical Industries is being held. Koppers is there again to discuss possible applications of coal tar products. (There are over two hundred identified chemical compounds in coal tar and possibly many more not yet identified.) Who knows what stories may be told four years from now about coal tar chemicals which have no known use now?

Koppers is already serving the chemical industry by producing phenol, cresol, xylenol, pyridine, quinoline, and other tar bases, naphthalene, light oil products, ammonium thiocyanate, refined tars, industrial pitches, and many other products.—Koppers Company and Affiliates, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY



BARDOL* in GR-S . . . *Tests have shown that Bardol is completely compatible with GR-S (Buna S), processing readily. It functions as a wetting agent and is also an effective plasticizer.*

. . . Bardol promotes dispersion of sulphur and accelerators in the elastomer, thereby improving behavior and performance of the compounds. Users have found that when incorporated in appropriate amounts, Bardol contributes to:

GREATER RESILIENCE

AND LOWER HYSTERESIS

IMPROVED RESISTANCE TO ABRASION

HIGH TENSILE STRENGTH AND ELONGATION

LOW PERMANENT

AND COMPRESSION SET

FLEXIBILITY AT LOW TEMPERATURES, RESULTING IN GREATER RESISTANCE

TO PLY SEPARATION.

For complete details, wire or write

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N.Y.

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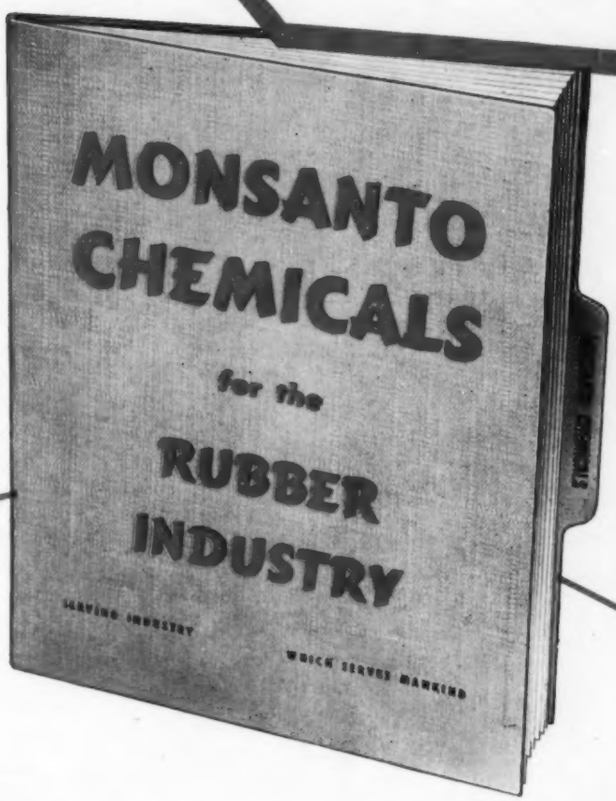
ONE OF AMERICA'S GREAT BASIC BUSINESSES . . .

Barrett

MAIL COUPON FOR USEFUL BOOKLET



QUICK FACTS on Monsanto Chemicals, for natural and synthetic rubber, are presented in tabulated form in this new catalogue, a really file-worthy booklet. The compounding suggestions will come in might handy. We feel sure you will want a copy of your reference. Mail the coupon *today* for your *free* copy.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY
Rubber Service Department
Akron 8, Ohio

Please send me a free copy of your reference booklet
"Monsanto Chemicals for the Rubber Industry."

Name.....Title.....

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TO THE PROCESSORS OF BUTAPRENE...

CHEMIGUM...HYCAR...NEOPRENE...

PERBUNAN...THIOKOL:...AN IMPORTANT

NEW PLASTICIZER, TP-90-B...

GIVES FINISHED PRODUCTS STRIKING

LOW TEMPERATURE FLEXIBILITY...

...WRITE FOR DATA AND SAMPLES.

TP-90-B

THIOKOL CORPORATION, TRENTON, N. J.

*Thiokol Corporation Trademark, Reg. U. S. Pat. Off.

NO TROUBLE IN SIGHT

NO TROUBLE IN SIGHT . . . WHEN YOU COMPOUND YOUR RUBBER WITH UNITED BLACKS

KOSMOBILE 77 · DIXIEDENSED 77
DIXIEDENSED · KOSMOBILE
KOSMOS 20 · DIXIE 20

UNITED CARBON COMPANY, INC.

Charleston, West Virginia

New York · Akron · Chicago

UNITED BLACKS

KOSMOBILE 77 · DIXIEDENSED 77

These blacks are ideally suited for Tread Compounding of Heavy Duty Tires for Trucks and Military Conveyances and for use in Synthetic Rubber and Reclaim. They Assure Maximum Reinforcement, Ease of Processing and Low Heat Build Up.

•

KOSMOBILE · DIXIEDENSED

Standard Dustless Rubber Blacks.

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KOSMOS 20 · DIXIE 20

Semi-reinforcing Blacks for Synthetic Carcass Stocks.

•

Our Technical Service Division is ready at all times to assist you with the application of our products to your Compounding Problems.

UNITED CARBON CO., Inc.

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HYDRAULIC PRESSES

FOR RUBBER AND PLASTIC *Molding*

Expertly designed to do all kinds of rubber and plastics molding, using multiple cavity molds, EEMCO Hydraulic Presses are furnished in standard sizes from 20"x20" to 48"x48". Pull back cylinders can be provided to separate molds, and presses can be equipped with double knock-outs for the ejection of molded pieces.

Send for illustrated folder describing EEMCO Presses or other Rubber working machinery.

Manufacturers of:

MILLS - REFINERS - TUBERS - EXTRUDERS
STRAINERS - HYDRAULIC PRESSES
CALENDERS - CRACKERS - WASHERS

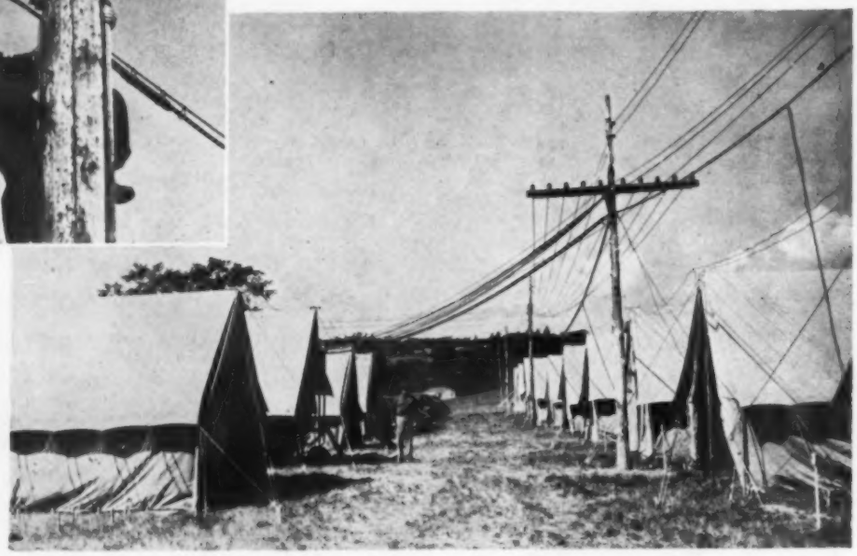
EEMCO — *Erie Engine & Mfg. Co.*

SUCCESSOR TO "NAGLE"

953 EAST 12th ST., ERIE, PENNA.

COMMUNICATIONS
DEPEND ON RUBBER INSULATION

Military and civilian communications could not function without thousands of miles of rubber-covered wire for which a high quality of reclaimed rubber is required in great quantity.



PEQUANOC RECLAIMS

conform to the strictly maintained standards required in the manufacture of insulated wire and cables.

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

BUTLER NEW JERSEY

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SYN-TAC

IMPROVES TACK
IMPROVES DISPERSION
IMPROVES TEAR
IMPROVES ELONGATION

The C. P. Hall Co. CHEMICAL MANUFACTURERS

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

yes—

We are Restoring Mill, Washer, Refiner Roll Journals . . .

Saving Equipment
Saving Investment

Before

After

Restoring efficiency of Processing Equipment helps in 2 ways to meet the Production Problem . . .

Every piece of equipment that can produce will be called upon to serve. Worn journals on mills and washers drag and delay, restricting output, consuming extra power . . . We can restore them to correct dimensions to speed up their processing ability, reestablish original efficiency . . . Our service provides another big help, too; it obviates the necessity of trying to replace hard-to-get equipment . . . Interstate will help you keep your mills, washers and refiners going at top speed. Write or wire us if you have a worn-journal problem.

SERVING THE RUBBER INDUSTRY

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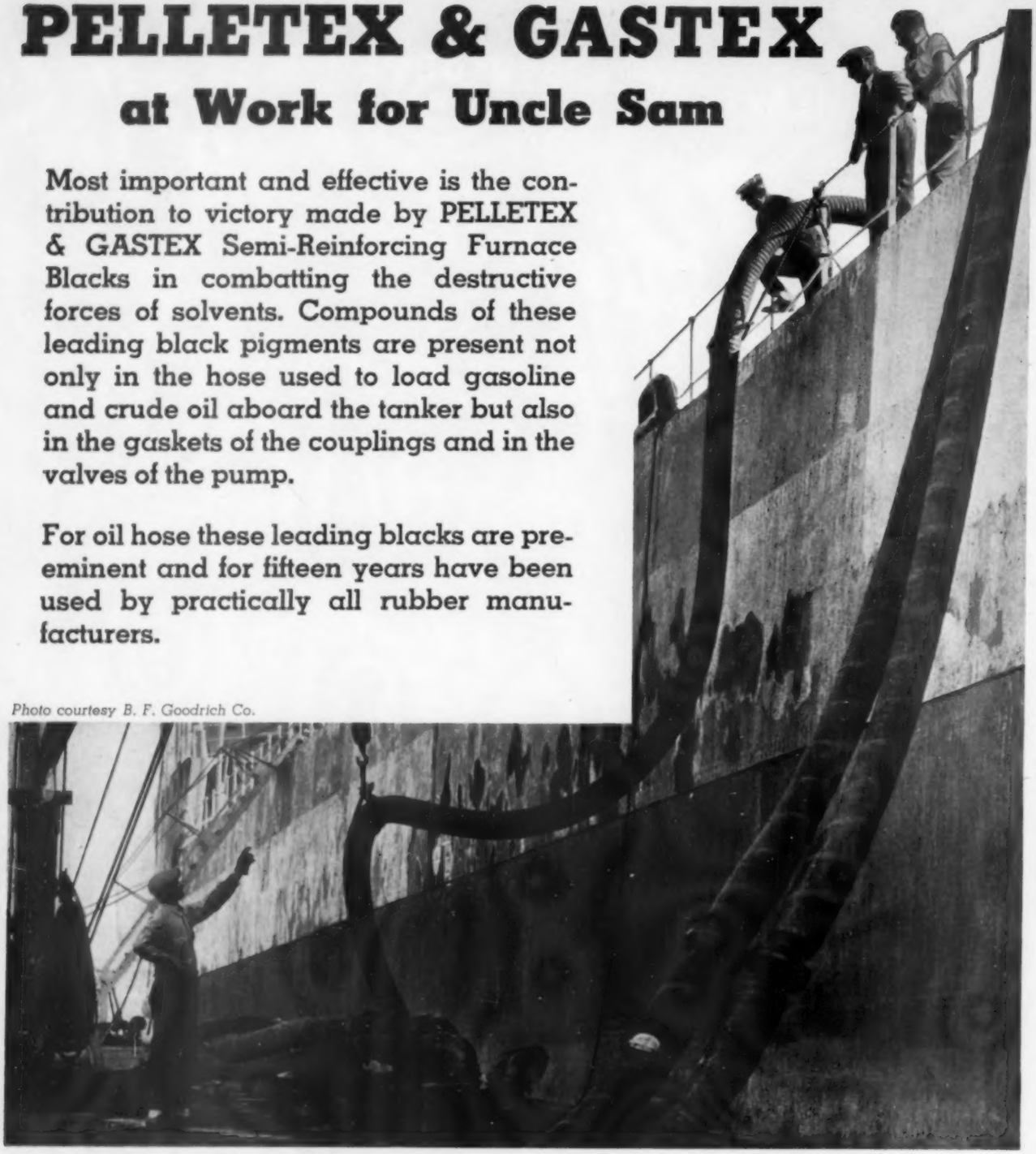

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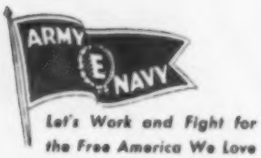

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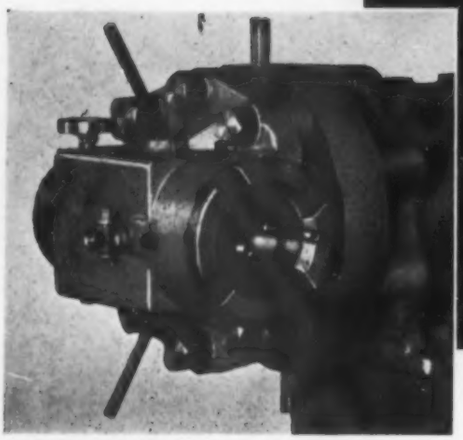

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The RUBBER AGE

VOL. 54, No. 2 NOVEMBER, 1943

The Compounding of Hard GR-S

By ROSS E. MORRIS[1], PHILIP MITTON[2], IRVIN P. SEEGMAN[3], and THEODORE A. WERKENTHIN[4]

SINCE GR-S (Buna S) has been established as the synthetic rubber to be made in the largest quantity during the present emergency, many laboratories have reported on the properties of soft stocks prepared from this rubber. Information on hard GR-S stocks has been limited to a paper read before the Detroit meeting of the American Chemical Society by Dr. Cheyney *(5)*. This paper described the analytical characteristics and tensile properties of simple vulcanizates composed of GR-S and sulfur. It was pointed out that GR-S vulcanizates increase in tensile strength as the sulfur content is increased from 0% through 35%. This is opposite to the behavior of Hevea rubber-sulfur vulcanizates, which suffer a serious loss in their tensile strength at intermediate sulfur concentrations.

The purpose of the work reported here was to gain information on the compounding of hard GR-S which could be used as a basis for devising technical stocks for specific applications. The authors were interested in finding the effects of sulfur content, type of pigment loadings, type of softener and type of accelerator on the tensile strength, ultimate elongation, flexural stiff-

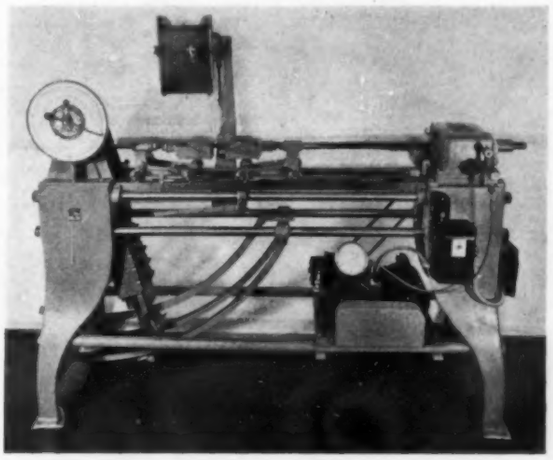


Fig. 1—Tensile Testing Machine.

(1, 2, 3) Senior Rubber Technologist, Rubber Technologist, and Assistant Rubber Technologist, respectively, of the Rubber Laboratory, Navy Yard, Mare Island, Calif.
(4) Senior Materials Engineer, Bureau of Ships, Navy Department, Washington, D. C.
(5) Cheyney and Robinson, *Ind. Eng. Chem.*, Vol. 35, p. 976 (1943).
Note: The opinions or assertations in this article are those of the authors, and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

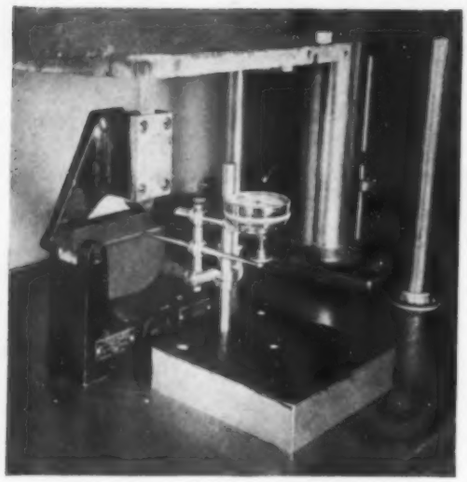


Fig. 2—Flexural Stiffness Apparatus.

Fig. 3—Rockwell Hardness Tester.

ness and hardness of hard GR-S vulcanizates. In addition, some indication of the softening point and impact resistance of hard GR-S vulcanizates was desired.

The study was made in a stepwise manner. First, the optimum amount of sulfur was determined. Using this amount of sulfur, the properties conferred by various pigments were found. Then, using the optimum amount of sulfur and the best pigment, the suitability of various softeners was found. Finally, using the optimum sulfur content, the best pigment loading and the best softener, the value of various accelerators was found.

Preparation For Testing

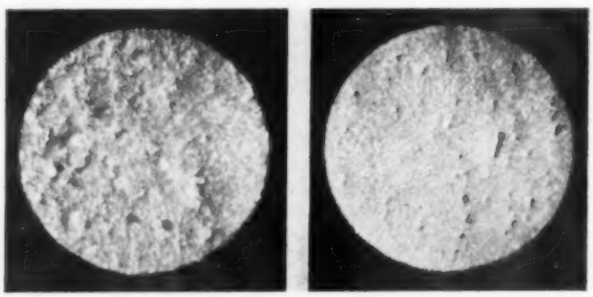
Mixing was done on a cold 10-inch x 20-inch mill. The GR-S was broken down by passing it 10 times between the rolls set at 0.02-inch opening. The mill was then opened to give a thicker band, and the sulfur was added. The sulfur was ground into the rubber by again tightening the rolls to give a 0.02-inch opening and passing the batch through 10 times. The batch was finished at a heavier gauge by rolling and cutting six times and passing through endwise six times. At least 24 hours later, additional compounding ingredients, if any, were added. The batch was allowed to stand for another 24-hour period, and then refined by passing three times through a tight mill.

The stocks were given set cures in the form of ⅛-inch thick sheets and ½-inch thick sheets in a hydraulic press. The set cures were just long enough so that the sheets had sufficient strength to be removed from the mold and were not too hard for cutting. A.S.T.M. tensile test specimens *(6)* and ½-inch square bars, five inches long, were cut from the semi-cured sheets. These specimens were then given their final cure in open steam.

After final cure, the surfaces of the specimens were smoothed and squared by buffing. This buffing was done on a water-cooled machine.

Fig. 4—Impact Tester.

(6) A.S.T.M. Tentative Methods of Testing Hard Rubber Products, Designation: D530-39T.



Sifted Ground Sulfur *Micronized Sulfur*

Fig. 5—Photomicrographs of cut sections of stocks containing 100 parts GR-S and 50 parts sulfur.

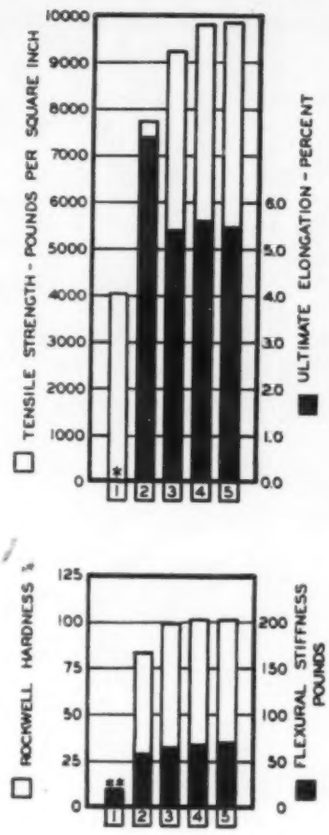


Fig. 6—Effect of Variation in Sulfur Content

LEGEND

Symbol	Amount of Sulfur parts per 100 GR-S	Time	Cure Temp.
1	20	26	307° F.
2	30	8	307° F.
3	40	19	287° F.
4	50	14	287° F.
5	60	11	287° F.

* Ultimate elongation, 46 per cent.

** Rockwell hardness reading, minus 67.

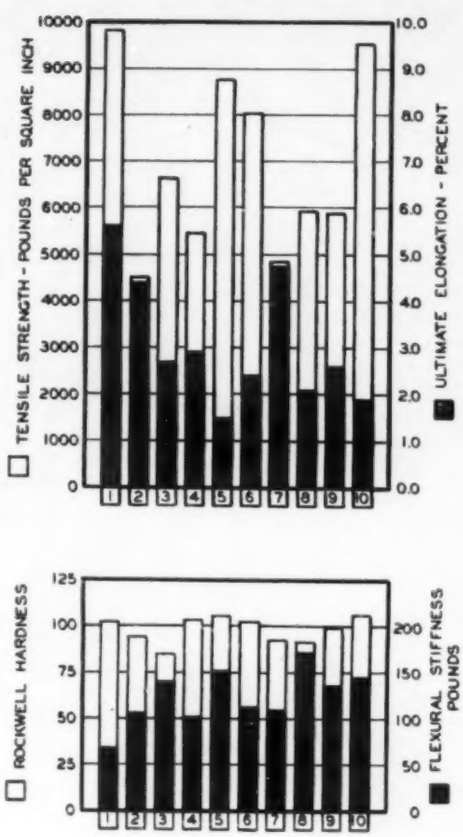
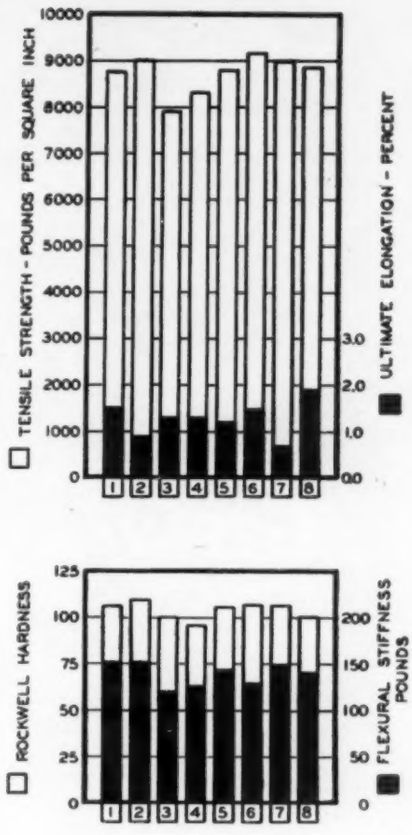

TENSILE STRENGTH - POUNDS PER SQUARE INCH
ULTIMATE ELONGATION - PERCENT
ROCKWELL HARDNESS
FLEXURAL STIFFNESS POUNDS
1 2 3 4 5 6 7 8 9 10

Fig. 7—Effects of Different Pigments at 60-Volume Loading

LEGEND

Symbol	Pigment Loading	Cure at 307° F. hours
1	No pigment (at 287° F.)	14
2	Whiting	5
3	Hard clay	5
4	Ground silica	5
5	Semi-reinforcing black	4
6	Calcium silicate	3
7	Barytes	5
8	Magnesium silicate	5
9	Iron oxide	5
10	Channel black	2½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ULTIMATE ELONGATION - PERCENT
ROCKWELL HARDNESS
FLEXURAL STIFFNESS POUNDS
1 2 3 4 5 6 7 8

Fig. 8—Effects of Different Softeners at 15-parts Loading

LEGEND

Symbol	Softener	Cure at 307° F. hours
1	No softener	4
2	Cumar P-10	5
3	Pine tar	3
4	Petroleum residuum	3
5	Rosin oil	5
6	Barrett #10 oil	4
7	Guayule rubber resin	4
8	Naftolen 510	2½

Methods of Testing

Tensile testing was performed in accordance with the method recommended by the A.S.T.M. *(6)*. The horizontal machine used for the tensile tests is shown in Fig. 1. The cure of each stock which gave the optimum tensile strength was selected for further tests. Each test result is the modal average obtained with 11 specimens.

Flexural stiffness was determined on the ½-inch square bars with the apparatus shown in Fig. 2. The bars were supported on ⅛-inch-radius bearing edges separated by a distance of 4.0 inches, and were flexed by application of a load midway between the points of support. The load was applied by means of a pressure piece having a ⅛-inch-radius bearing edge. The load necessary to cause a deflection of 0.050-inch at the center of the beam was considered to be a measure of the stiffness of the hard rubber. The entire apparatus was supported on the weighing platform of a universal tester, by means of which the applied load was measured. The deflection was measured with a micrometer gauge. Each test result is the modal average obtained with five specimens.

Hardness was determined on ⅛-inch thick specimens with the Rockwell hardness tester as recommended by the A.S.T.M. The Rockwell hardness tester is illustrated in Fig. 3. Each test result is the modal average obtained with four specimens.

Softening point and impact resistance were determined by the A.S.T.M.-recommended methods. The impact test was performed on the simple-beam notched specimen (Charpy type) as shown in Fig. 4. Each test result is the modal average obtained with three specimens in the case of softening point, and with five specimens in the case of impact resistance.

Effects of Sulfur Content

Before entering into a study of the effects of sulfur content, it was considered advisable to investigate the relative suitabilities of ordinary ground sulfur and micronized sulfur from the standpoint of ease of dispersion in the GR-S. Micronized sulfur is a very finely ground sulfur produced by the Micronizer Processing Company, Inc.

Two batches were prepared. One batch contained 50 parts of ground sulfur in 100 parts of GR-S; this sulfur was sifted through a 100-mesh screen previous to use. The other batch contained 50 parts of micronized sulfur in 100 parts of GR-S; this sulfur was not sifted. Within eight hours after sheeting off the mill, cut sections of the stocks were examined under the microscope. The photomicrographs of the cut sections are shown in Fig. 5. The better dispersion in the case of the micronized sulfur is clearly evident.

Further evidence in favor of the micronized sulfur was obtained from tensile tests on the respective stocks after curing for 14 hours at 287° F. The test results were as follows:

Sulfur	*Tensile Strength p.s.i.*	*Ultimate Elongation %*
Ground	9250	5.9
Micronized	9760	6.8

In view of the benefits found from using micronized sulfur, this sulfur was used in all subsequent work with hard GR-S.

Batches containing 20, 30, 40, 50, and 60 parts of micronized sulfur, respectively, per 100 parts of GR-S were prepared. The stocks containing 20 and 30 parts of sulfur, respectively, were vulcanized at 307° F. The stocks containing 40, 50, and 60 parts of sulfur, respectively, were vulcanized at 287° F. because it was found that these stocks were blown when vulcanized at 307° F.

The cures for optimum tensile strengths are listed below Fig. 6. The bar graphs show that 50 parts of sulfur yielded optimum properties. There was, however, little difference between the properties of the stocks containing 40, 50, and 60 parts of sulfur, respectively. It was decided to use 50 parts of sulfur in the remainder of this work.

A comparison was made of the properties of hard GR-S with those of hard Hevea rubber. Both stocks contained 50 parts sulfur and no other compounding ingredients. The data are given below:

	Hevea	*GR-S**
Cure for optimum tensile strength, hours at 287° F.	8	14
Tensile strength, p.s.i.	8560	9820
Ultimate elongation, per cent	6.2	5.6
Rockwell hardness reading	90	102
Flexural stiffness, lbs.	67	67
Softening point, °F.	145	144
Impact resistance, foot lbs.	0.45	0.23

* This was a different lot of GR-S from that used for the comparison of ground sulfur and micronized sulfur.

The Hevea stock was superior to the GR-S stock in curing rate and impact resistance. The Hevea stock was inferior to the GR-S stock in tensile strength and hardness.

Effects of Pigments

The effects of different pigments at 60-volume loading on the properties of the 50-part sulfur stock are shown in Fig. 7. These pigments generally speeded up the cure for optimum tensile strength. This was particularly true in the case of the channel black loading. The cures are listed below the charts in Fig. 7.

The pigments, of course, smoothed out the raw stocks. However, the stocks loaded with whiting and silica were difficult to handle because they possessed poor cohesive strength and therefore tended to crumble on the mill. Moreover, the stock loaded with channel black was somewhat stiff, and the stock loaded with calcium silicate was so stiff that it stopped the laboratory mill.

None of the loaded stocks quite equalled the base stock in tensile strength, ultimate elongation, or flexibility. The stocks loaded respectively with channel black, semi-reinforcing black, and calcium silicate, in order of preference, had the highest tensile strengths. The stocks loaded respectively with whiting and barytes had the highest ultimate elongation. The stocks

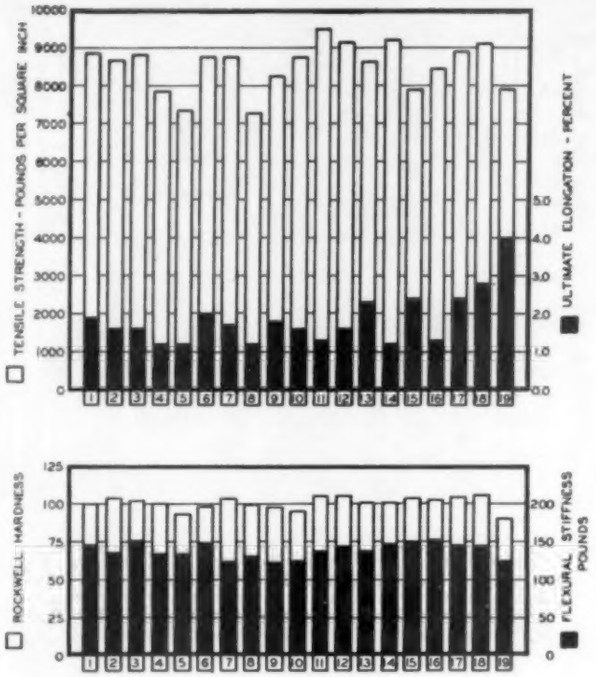


Fig. 9—Effects of Different Accelerators.

LEGEND

Symbol	*Accelerator*	*Amount*	*Cure at 307° F. hours*
1	No accelerator		2½
2	Magnesia	5 vols.	1½
3	Hydrated lime	5 vols.	2
4	Litharge	5 vols.	2½
5	Zinc oxide	5 vols.	2
6	Vandex	2 pts.	2
7	Telloy	2 pts.	1½
8	A-77	2 pts.	1½
9	808	2 pts.	1
10	833	2 pts.	1
11	D.O.T.G.	2 pts.	1½
12	D.P.G.	2 pts.	2
13	Santocure	2 pts.	1½
14	Captax	2 pts.	2
15	Altax	2 pts.	2½
16	2-MT	2 pts.	2
17	Thionex	2 pts.	2
18	Methyl Tuads	2 pts.	2
19	Methyl Zimate	2 pts.	3/4

loaded respectively with whiting, silica, calcium silicate, and barytes had the greatest flexibility. None of the loaded stocks were much harder than the base stock, and several were softer.

The authors were interested in obtaining a stock with strength and stiffness. Therefore, the semi-reinforcing black was selected as the loading for further work. The channel black was not selected because it gave such a stiff unvulcanized stock.

Effects of Softeners

The effects of different softeners at 15-part loading are given in Fig. 8. Some of the softeners, notably Naftolen 510, decreased the time to reach optimum tensile as is shown by the data below the charts.

Most of the raw stocks containing softeners had more tack than the base stock as determined qualitatively by hand test. The tackiness and Mooney plasticity of each stock are tabulated below:

Softener in Stock	*Tack*	*Mooney Plasticity at 212° F.*
Cumar P-10	Fair	64
Pine tar	Good	64
Petroleum residuum	None	89
Rosin oil	Good	61
Barrett #10 oil.....	Fair	64
Guayule rubber resin.....	Fair	58
Naftolen 510	Poor	59

Rosin oil was an outstanding softener from the standpoint of tack. The raw rosin-oil stock also had fairly low plasticity and the vulcanizate had good tensile strength. The only disadvantage of rosin oil was its detrimental effect on the rate of cure.

The stock containing Naftolen 510 had higher ultimate elongation than the base stock and had, as mentioned above, a much faster rate of cure. Therefore, Naftolen 510 was chosen as the softener to use in the base stock for the accelerator comparison.

Effects of Accelerators

The effects of numerous inorganic and organic accelerators on the base stock containing 50 parts micronized sulfur, 60 volumes (115 parts) semi-reinforcing black, and 15 parts Naftolen 510 are shown in Fig. 9. Beneath the charts are listed the accelerators tested and the respective curing times for optimum tensile strength.

The fastest cure was obtained with Methyl Zimate. This stock, however, was impractical because it set up in storage. The next fastest cure was obtained with the aldehyde-amine accelerators, 808 and 833. These stocks did not set up in storage and their vulcanizates possessed good tensile properties. Methyl Tuads did not speed up the cure very much, but its vulcanizate had good tensile strength and better elongation than all of the other stocks except the Methyl Zimate stock.

Summary

A survey has been made of hard GR-S with regard to sulfur requirement and effects of various pigments, softeners, and accelerators on tensile strength, ultimate elongation, hardness, and stiffness. Of particular interest were the observations that the hard GR-S had a higher tensile strength than hard Hevea rubber, and that the hard GR-S did not undergo much loss in tensile strength when compounded with 60 volumes of channel black or semi-reinforcing black.

ACKNOWLEDGMENT

The considerable assistance given by Reed W. Rushton in this work is gratefully acknowledged.

Water Emulsions of Polyvinyl Acetate

EMULSIONS of polyvinyl acetate in water, recently introduced by the Electrochemicals Department of E. I. du Pont de Nemours & Co., Inc., are said to be a significant development in the field of synthetic resins, since they offer a means of greatly extending the commercial usefulness of polyvinyl acetate which has found numerous applications in industry in recent years. The new water emulsion simplifies the handling of polyvinyl acetate and avoids the use of flammable solvents.

Polyvinyl acetate emulsions are free-flowing, milky-white, stable liquids containing approximately 60% resin dispersed in water. The commercial emulsions contain less than 1% of unpolymerized vinyl acetate and less than 0.3% acetic acid. The pH of the emulsions is 4.5 to 5.5, and they are therefore somewhat corrosive to iron and ordinary steel. This corrosion, due to the small amount of free acetic acid in the emulsions, may be inhibited by adjusting the pH to 8.0 with triethanolamine; 1 or 2% of this reagent is generally sufficient. Triethanolamine imparts a slight pink color to the emulsion; if this is objectionable, aqueous ammonia may be substituted. Ammonia should be added just before the emulsion is used in order to prevent the settling of resin on standing. Strong alkalis should not be used because they catalyze the hydrolysis of polyvinyl acetate. In fact, wherever possible, triethanolamine should be used as the acid inhibitor instead of ammonia because ammonia will also catalyze hydrolysis of polyvinyl acetate.

These emulsions, used for bonding a wide variety of materials, including metals, cellulose products, certain synthetic resins, leather, cork, etc., are compatible with considerable amounts of chlorinated rubber and rubber latex, among other materials. In some cases "creaming" or layering of such mixtures may occur on standing, but agitation will restore the mixtures to their original condition. These mixtures lend themselves to special adhesive applications.

For instance, special adhesives for bonding leather to metal can be made by addition of 6 to 40% latex (based on solid acetate content) to the polyvinyl acetate emulsions. The latter are made slightly alkaline to litmus with aqueous ammonia or triethanolamine, just before adding the latex. It is important that the surface of the metal be free from oil and grease before application of this adhesive. This can be done by using suitable solvents, such as trichlorethylene, acetone, perchlorethylene or the like.

Some Further Data on Marvinol—The New Elasto-Plastic

BRIEF reference to the announcement of Marvinol, a new elasto-plastic, by the Glenn L. Martin Co., Baltimore, Maryland, was made in the September, 1943, issue of RUBBER AGE. According to Martin engineers, it has already demonstrated its superiority to both natural and synthetic rubber for such varied applications as automobile inner tubes, elastic gloves for home, hospital and laboratory use, and many general household and industrial uses. Some general information on the new material, actually a vinyl-type plastic, as furnished by its manufacturer, follows:

Marvinol is not a synthetic rubber, but a completely new material which is better suited for many of the purposes for which rubber has previously been used than rubber itself, as well as bridging many gaps not hitherto filled by the synthetic rubbers. Inner tubes, for example, can be fabricated from Marvinol more easily than from rubber, and because of the absolute impermeability of the elasto-plastic, the seepage of air through the sidewall of the tube is entirely eliminated —an accomplishment which could not be obtained with even the finest gum rubber.

Most important of all from the standpoint of the tube user, however, is the fact that Marvinol is 100 per cent reclaimable. In cases where a tube is damaged, the motorist, instead of discarding it as a total loss, will be able to trade it in on a new tube. This property of 100 per cent reclaimability may in itself revolutionize the entire inner tube industry.

A second application in which the new elasto-plastic has demonstrated a marked superiority over rubber and synthetic rubber, is in "rubber" gloves for surgical, laboratory, and household use. Marvinol gloves made up in the Martin laboratories have not only been tried out in actual service conditions by surgeons in hospitals, but they have been extensively tested in the chemical and industrial laboratories, where their ability to resist alkalies and acids in water solution resulted in a longevity and standard of performance unobtainable with similar gloves made from other materials.

William Smitzel, assistant plant superintendent of Schenuit Rubber Co., examining a sheet of Marvinol.

Clayton F. Ruebensaal, co-developer of Marvinol, feeding stock in a laboratory mill.

Several pairs of these gloves were turned over to photograph laboratories and used for sixteen hours a day in solutions of developer, hypo and other photo chemicals. At the end of 55 days they exhibited slight signs of deterioration, but were still usable. Rubber gloves previously used under exactly the same conditions had rotted and become completely unserviceable in fourteen days. Persons using the Marvinol gloves reported, in addition, that they are more comfortable and that they had a far greater resistance to abrasion, snags and tearing than rubber and synthetic rubber gloves. In addition, wearers report that they can "feel" better through these gloves.

While Martin scientists have been concentrating their attention on the application of Marvinol for inner tubes, gloves and certain aircraft uses which cannot be talked about for reasons of military security, because of its demonstrated superiority to rubber and other synthetics in such applications, they have also duplicated experimentally many other products that are now made only from rubber. Among these have been Marvinol nipples for nursing bottles, molded goods, fountain pen sacs which ink will not stain or adhere to, bulbs for eye droppers, hot water bottles, soles, heels, and even pencil erasers.

In common with the vinyl plastics, Marvinol has properties of reclaimability due to its thermoplastic nature, superior abrasion resistance, ability to withstand constant flexing without fatigue, and impermeability to gases and liquids. Up to now the one stumbling block standing in the way has been the failure of vinyl materials to remain stable at high temperatures, in strong sunlight, or when in contact with even dilute acid or alkaline solutions. In the case of Marvinol, however, this obstacle has been overcome by the inclusion of a sealed-in, non-extractable plasticizer in the compound.

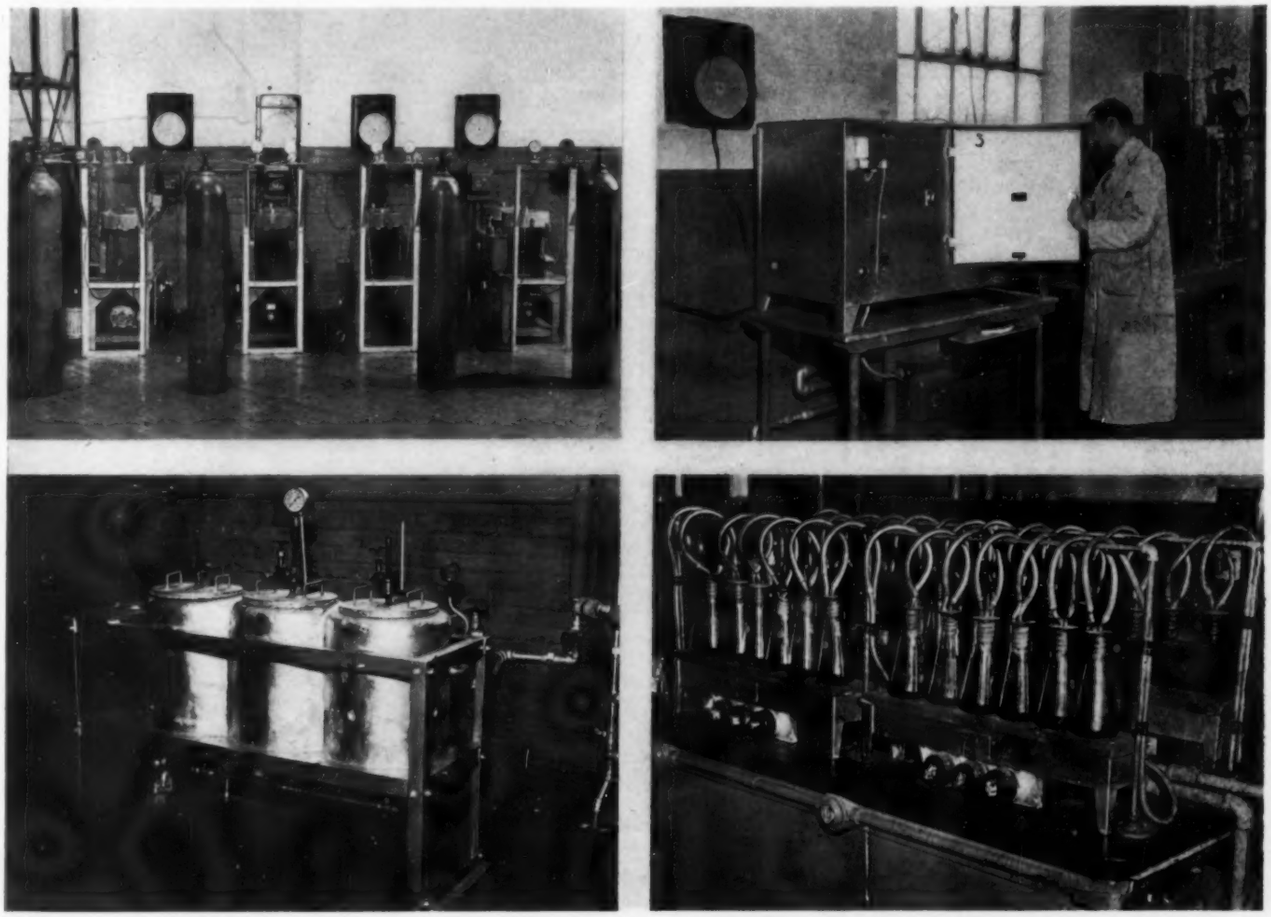
Developing Rubber Compounds in Roebling's New Laboratory

By EDWARD E. ZEILSTRA

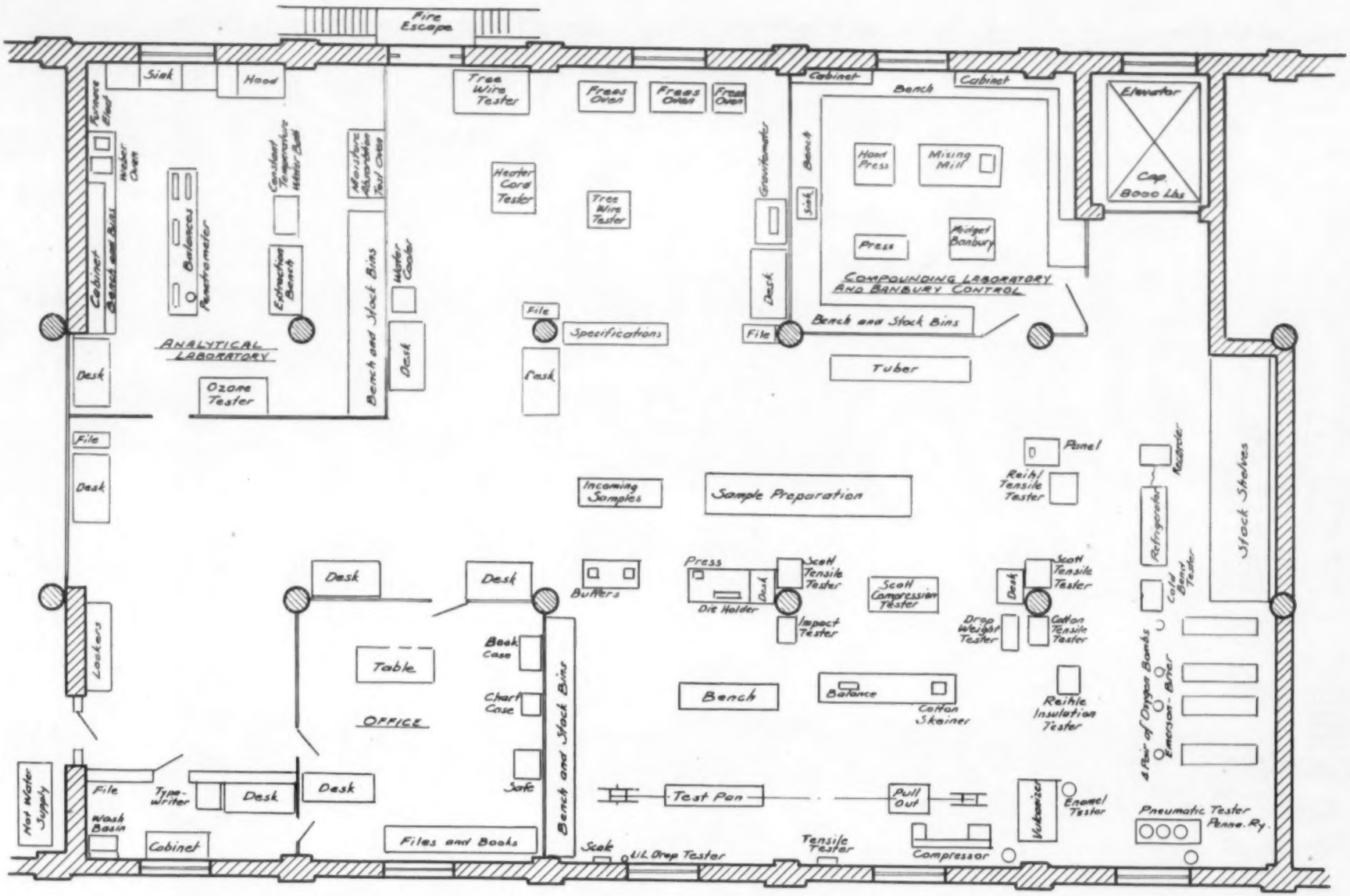
Chief Rubber Chemist,
John A. Roebling's Sons Co.,
Trenton, New Jersey

FACED with the necessity of meeting increasingly rigorous specifications for insulated wires and cables despite war-bred shortages of raw materials and equipment, the Electrical Wires and Cables Division of the John A. Roebling's Sons Company, Trenton, N. J., undertook, the end of last year, to equip a new testing, rubber development and production control laboratory.

In this laboratory, designed for raw material and product development and testing, and product research, every effort has been made to increase the efficiency of procedure and the accuracy of results by facilitating



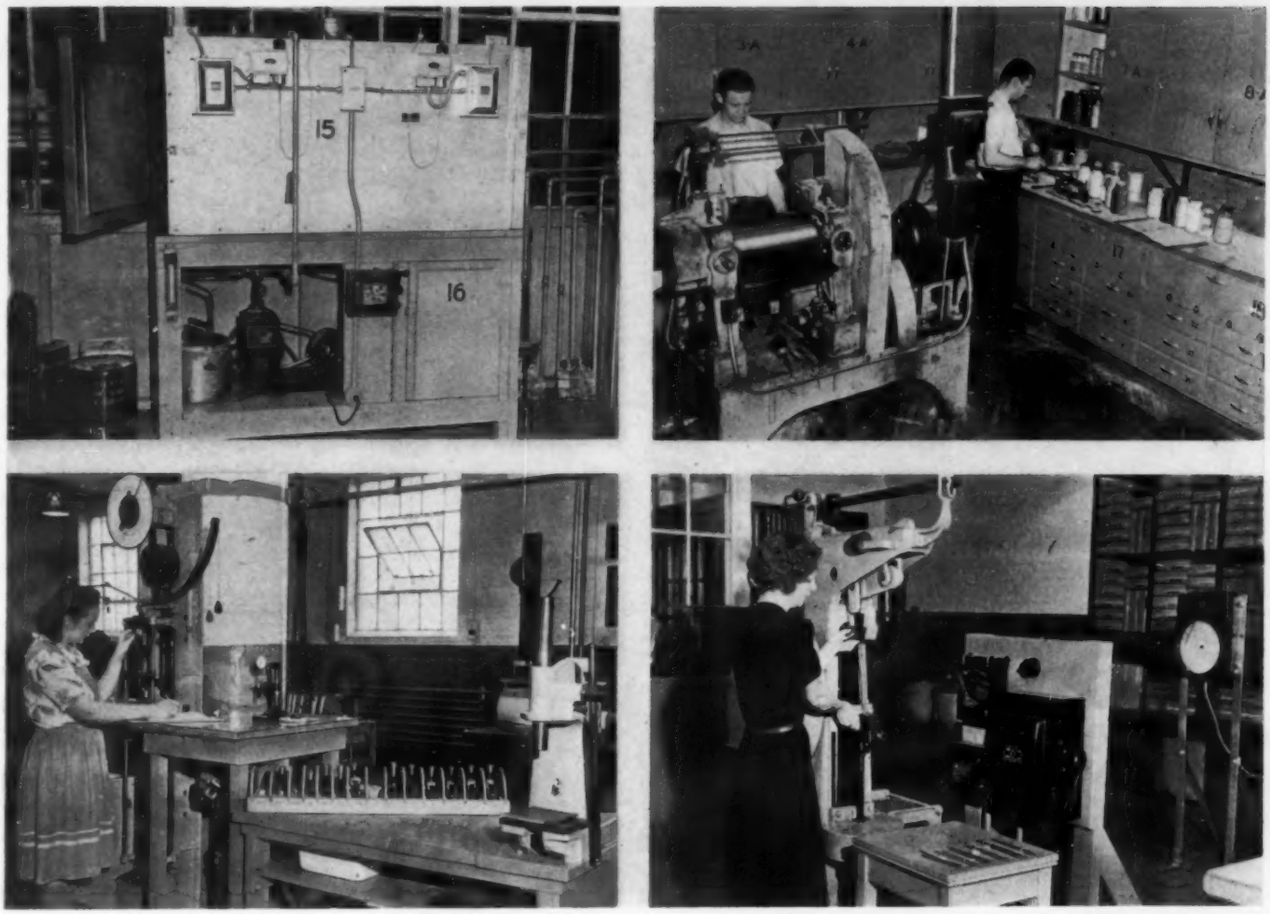
UPPER LEFT: A battery of four pairs of oxygen bomb testing machines in the new Roebling Rubber Laboratory. Each machine is equipped with a separate permanent temperature recorder and each is individually fused so that an overload on one will not shut down the whole battery. UPPER RIGHT: The Freas Ovens are individually equipped with permanent recording pyrometer, controls and fuses. LOWER LEFT: The Air Bomb testing chambers are raised on steel framework to facilitate loading and unloading and to bring thermometers and pressure gauges to convenient level for accurate reading. LOWER RIGHT: Four heating units, each individually controlled and fused, are mounted on the extraction bench. Six extraction flasks can be placed on each unit.



INSULATED WIRE LABORATORY OF JOHN A. ROEBLING'S SONS CO., TRENTON, N. J.

Department No. 759
Floor Space 5020 sq. ft.

Drawn October, 1943
Scale: Approximately 1/10" = 1'



UPPER LEFT: Converted from an old oxygen bomb testing device of original Detroit Edison design, this water absorption test apparatus is also mounted on a stand to raise it to convenient working level. The door at the left was formerly hinged at the bottom and opened from the top down but was converted to side opening as seen. UPPER RIGHT: All of the controls of the laboratory mill are enclosed. The numbered and enclosed drawers and cabinets in the background are used for storing compounding materials, keeping them clean and free from contamination by other compounding ingredients. LOWER LEFT: Scott Vertical Testing Machine and arbor press for preparing test specimens. LOWER RIGHT: The Riehle Tension Testing Machine seen has been re-equipped with "streamlined" controls. Replacing the old open knife switches, the new enclosed controls are mounted within easy arms length reach of the operator. Stock classification racks can be seen in the background.

operations. Each piece of equipment has been arranged and located so that the technicians will have optimum conditions of light, ease of posture, and accessibility to the apparatus, to materials, and to record sheets. Months of careful study preceded the actual work of arranging the details.

A large part of the work done in this laboratory is the development of new rubber and synthetic compounds for wire insulation. Experimental compounds are made in the compounding and milling room where complete facilities have been installed for such work. As new compounds are made, they are mixed by the compounding mill or the midget Banbury, and then the batch is stored on enclosed sliding trays until ready for curing in the press. Cleanliness of the component ingredients is insured by the storage of the different substances in numbered drawers and compartments which are completely enclosed, so as to prevent contamination of one component by another or by mill-room dirt.

The same cleanliness of the mixed stock is insured by the fact that the trays on which it is stored are completely enclosed from dirt and mill-room dust. Again, labelled waste cans are placed conveniently near each machine so that scrap material can be segregated by type and incur little ultimate waste.

A new compound, which has passed all of the thorough development tests to which it is subjected, is sent to the factory for a production trial run. After the stock has been mixed in the factory it is thoroughly sampled and tested in the laboratory before being sent on through subsequent production operations. When the laboratory releases it as being acceptable, the factory then applies it as insulation on wire and cures it in the normal manner.

Immediately after it is cured, the insulated wire is sampled and the samples are subjected to rigorous tests in the laboratory before the finishing manufacturing operations are performed. Not until the laboratory releases the material as satisfactory can the

Assembled from parts collected from scrap yards, this curing press is hand operated by a Watson-Stillman oil hydraulic pump, the lever of which has been raised to permit maximum ease of operation. Note the shelf attached to the lower platen for convenience in removing molds.

order be completed in the mill. After the final manufacturing operations, the finished product is subjected to thorough tests and examinations.

Each development compound—that is, compounds which have not been finally introduced into the regular mill schedule—is accompanied on its test runs through the mill by a check form on which is made a detailed record of every significant factor which might in any way bear upon the performance of the insulation after it has been applied. In evaluating the worth of each newly developed compound, therefore, there is available complete information about conditions under which manufacturing processes took place. Quite frequently a slight change in manufacturing procedure or condition can be made and avoid the necessity for making chemical readjustments in the formula itself.

The above procedure applies not only to test runs of new compounds, but is followed as a basis for checking daily production schedules of the factory. Every batch of Banbury mixed stock is tested for plasticity, hardness, specific gravity and tensile strength. In addition, according to the specifications, the stock also is subjected to oxygen bomb, air bomb, tear, twist and Geer oven tests.

Each supply of incoming raw materials is thoroughly analyzed before it is released to production. The past record is available at all times for checking with subsequent test records on compounds in which any given raw material is used. In this connection, it is interesting to note a complete and simple system of records is kept in this laboratory, copies are filed at the Roebling General Engineering Laboratory and in the Electrical Engineering office of the Wire and Cable Division.

Tags are put on test samples of insulated products when they are cut and a record is made of the date, shift, and operator's check number in the factory; then, the shop compound or development compound number is noted, and, finally, the order number and sample number are entered.

One copy of the test results is filed permanently with the copy of the order for future customer reference. A second copy is entered in a file according to the compound used. In this way a guide is established of each compound run through the mill so that any variations or changes in performance can be traced accurately and quickly. A third copy is kept in the file of the technician making the test. This places copies of reports in two separate buildings apart from the testing laboratory so that in the case of fire or other emergency destroying one set of files the others are always available.

In equipping the laboratory, modern controls and recording facilities have been taken advantage of and many practical ideas have been introduced. For instance, on all tests which call for temperature control, permanent records are made of the temperature on Bristol automatic recorders. Each electrically-operated piece of apparatus is equipped with its own fuse. In this manner, only the apparatus unit causing the overload will be shut down when a fuse blows, rather than the whole battery of units or a complete section of the laboratory.

Throughout the laboratory individual controls for each machine have been installed and are completely enclosed for the sake of efficiency and safety. The accompanying illustrations show various pieces of the equipment as captioned and the general arrangement of the laboratory.

Book Reviews

Towers of Triumph. Dayton Rubber Manufacturing Co., Dayton, Ohio, 11 x 8¼ in. 44 pp.

The story of synthetic rubber is told in both text and pictures in this attractive, two-colored booklet. The history of the material is briefly told, with some commentary on both German and Russian development, and then a number of answers to common questions on synthetic rubber are given. The manufacture of GR-S is pictorially depicted in the form of a flow chart, as well as by the incorporation of numerous photographs taken at the copolymer plant operated at Baton Rouge, La., by the Copolymer Corp. Dayton Rubber is one of the several tire companies behind the Copolymer organization. A number of the company's synthetic rubber products are also shown in the booklet.

•

Industrial Heat and Power Conservation Manual. Industrial Mineral Wool Institute, 441 Lexington Ave., New York, N. Y. 8½ x 11 in. 20 pp.

Data on practical engineering methods of calculating and reducing preventable heat and fuel losses and nine typical examples of savings are presented in this manual, compiled as a service to American industry. Incorporated in the manual is a "heat loss estimate sheet" which can be removed for survey use in the plant. Time saving graphs, tables, formulae and examples on the back of this sheet make it possible for even the layman to work through a heat loss survey.

Improved Tensiles for Thiokol Type FA Stocks

By A. E. LAURENCE and V. H. PERRINE

Development Dept., Thiokol Corporation, Trenton, N. J.

LIKE many of the synthetic rubbers, Thiokol Type FA[1] exhibits poor physicals in pure gum vulcanizates. In order to obtain desirable characteristics in commercial stocks, it is necessary to use reinforcing pigments. The semi-reinforcing blacks have been used for this purpose, principally because of their ease of incorporation and minimum effect on curing rate. While tensiles of SRF black stocks (see footnote) have been satisfactory for most applications, there have been instances where higher tensiles were required.

The most promising method of improving tensiles would, of course, utilize the finer particle blacks such as the channel blacks and the fine furnace blacks. The effect of various blacks and mixtures of blacks on the properties of Thiokol FA stocks have been investigated. Several methods by which tensiles can be improved are to be discussed in this article.

Note: Carbon black nomenclature and symbols used throughout this article are those agreed upon by the Nomenclature Committee acting through the Office of the Rubber Director and published in RUBBER AGE (N. Y.), July and September, 1943, and *India Rubber World*, August, 1943, as follows:

HPC	Hard Processing Channel Black
MPC	Medium Processing Channel Black
EPC	Easy Processing Channel Black
FF	Fine Furnace Black
HMF	High Modulus Furnace Black
SRF	Semi-Reinforcing Furnace Black

[1]The trade name "Thiokol" used throughout this article is registered in the U. S. Patent Office.

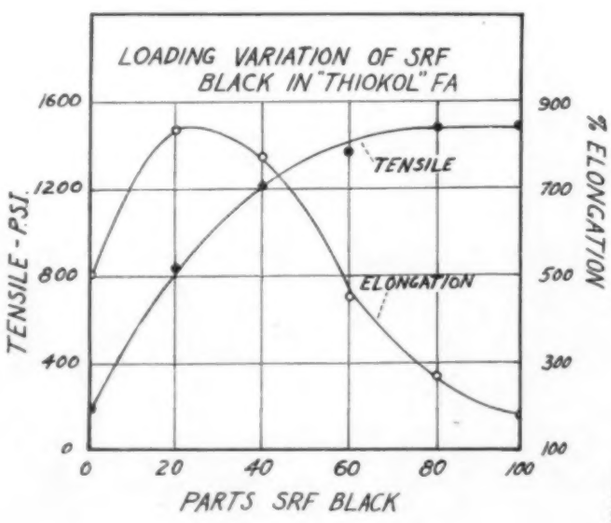


Fig. 1

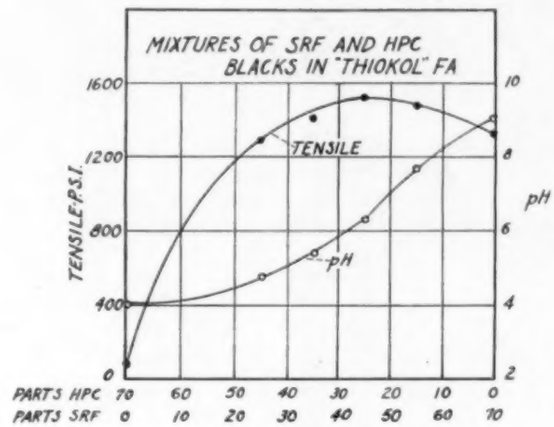


Fig. 2

Optimum reinforcement by SRF black occurs with 60 to 70 parts of black per 100 parts of Thiokol FA (see Fig. 1), resulting in tensiles of 1300 p.s.i. and elongations of about 400%. The SRF black content was varied from 0 to 100 parts in steps of 20 in the following base stock which, incidentally, was also used in all other stocks reported herein:

Thiokol FA	100.
Zinc Oxide	10.
Stearic Acid	0.5
Benzothiazyl Disulphide	0.4
Diphenyl Guanidine	0.1

Channel blacks, on the other hand, have a decided retarding effect on cure and result in logy vulcanizates. Tensiles do not reach values which might be expected if usual differences in reinforcing characteristics between channel and SRF blacks are considered.

Reinforcing blacks of the various groups were tested in the base recipe given above using a loading of 70 parts black (52.2 volumes). Test data as summarized in Table I show that HPC black inhibits cure completely in Thiokol FA. MPC and EPC blacks reach tensiles which are about equal to the SRF black, but the state of cure is rather low, resulting in logy vulcanizates.

The rate of cure of Thiokol FA, like that of most rubbers, is greatly retarded by acidic materials. Consequently, it is not difficult to understand why channel blacks with their low pH retard cure. Measurements of pH of the blacks and their mixtures were made by the method used by Wiegand ("pH Properties of Col-

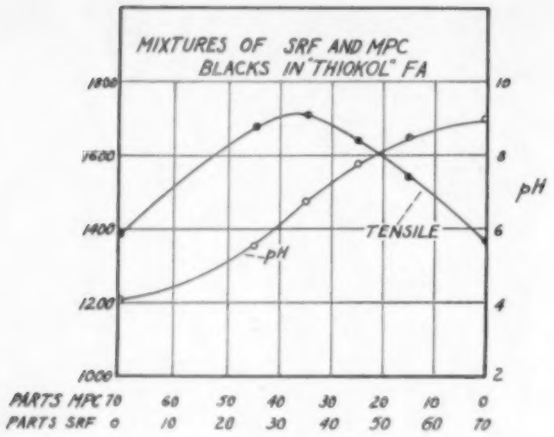


Fig. 3

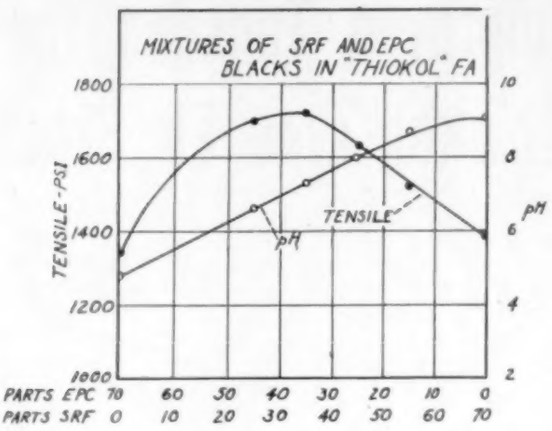

MIXTURES OF SRF AND EPC BLACKS IN "THIOKOL" FA
TENSILE - PSI
TENSILE
pH
PARTS EPC 70 60 50 40 30 20 10 0
PARTS SRF 0 10 20 30 40 50 60 70

Fig. 4

loidal Carbon," *Ind. & Eng. Chem.*, Vol. 29, pp. 953-56, 1937). A black sludge was prepared by boiling 15 grams of black in 50 ml. of freshly distilled water and pH was measured after the sludge had cooled to room temperature.

A study of the mixtures of SRF black and various channels in Thiokol FA brought out some unusual characteristics. Using the base recipe previously shown and a constant loading of 70 parts of black, the composition of the black mixture was varied from 70 parts SRF black and no channel black to no SRF black and 70 parts channel black. In this group mixtures of SRF black with HPC black, MPC black, and EPC black were studied.

Figures 2, 3 and 4 illustrate the effect of increasing the amount of channel black, while the amount of SRF black is correspondingly reduced on tensile of stock and pH of black. Tensiles of stocks containing equal parts of SRF and channel black are in each case higher than the tensile of either black alone. The inflection of the tensile vs. composition curve occurs at a pH between 6 and 7 and is evidently the point where reinforcing characteristics of increasing amounts of channel black are nullified by the effects of acidity of the channel black on cure. The critical pH range could undoubtedly be narrowed down by studying a number of variations in black composition in the range where the tensile curve reaches a maximum.

Mixtures of SRF black with MPC or EPC raise the tensile of Thiokol FA stocks to 1700 p.s.i. and show elongations of 370%. These figures should be compared with tensiles of 1300 to 1400 p.s.i. and elongations of 300% to 350% for SRF stocks at the 70/298° F. cure.

Since the fine furnace blacks are alkaline and impart excellent physical properties to Thiokol FA (Table I), it would be logical to assume that mixtures of SRF and FF blacks should not retard cure and should reinforce somewhat in proportion to the amount of each type of black present in the mix. This is essentially the case and is illustrated in Fig. 5. As would be expected the pH of these black mixtures lies between that of the two components.

Since mixtures of SRF blacks with channel blacks exhibited higher tensiles than either black alone, mixtures of FF black and EPC black were investigated. The base recipe was the same as that used in preceding tests with 70 parts of black. Here again the composition of the black mixture was varied with the loading held constant. Results, as illustrated in Fig. 6,

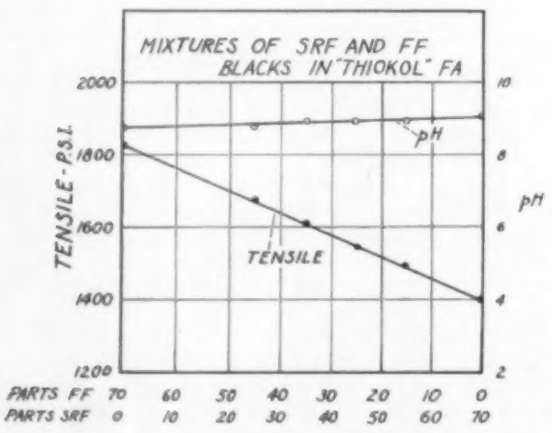


Fig. 5

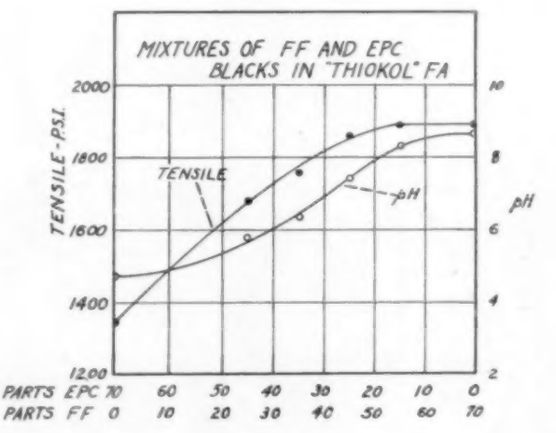


Fig. 6

TABLE I—COMPARISON OF BLACKS IN THIOKOL FA
(70 Part Loading)

Type Black	Cure Min. @ 298° F.	300% Mod.	Tens.	Elong.	Duro.	Tear	pH
Hard Processing Channel..	30	95	110	590	65	51	3.95
	50	90	105	630	63	47	
	70	80	85	580	61	45	
Medium Processing Channel	30	580	1000	550	75	174	4.15
	50	840	1250	470	76	233	
	70	1020	1385	420	77	306	
Easy Processing Channel..	30	575	955	590	76	161	4.77
	50	855	1250	470	77	283	
	70	1000	1350	420	78	315	
Fine Furnace	30	1175	1535	460	75	355	8.74
	50	1595	1760	370	78	368	
	70	....	1825	270	80	311	
High Modulus Furnace....	30	1255	1445	370	75	322	...
	50	....	1525	290	77	341	
	70	....	1490	250	77	295	
Semi-Reinforcing Furnace..	30	915	1100	470	75	298	8.98
	50	1235	1305	370	78	312	
	70	....	1385	280	81	198	

TABLE II—EFFECT OF ALKALINE BUFFERS ON CURING QUALITIES OF CHANNEL BLACK IN THIOKOL FA STOCK*

Part 1—With 70 Parts MPC (70/298 Cure)

Material	Amount	300% Mod.	Tensile	Elong.	Duro.
None	..	830	1055	400	76
DPG	0.5	1450	1625	360	83
DOTG	0.5	1585	1765	350	82
Dodecyl Amine ..	0.5	645	825	420	75
Dibutyl Amine ..	0.5	850	1055	400	77
20% aq. NaOH ..	0.5	905	1110	410	77
$Zn(OH)_2$	2.5	785	995	390	77
$Ba(OH)_2$	2.5	....	940	270	76
$Ca(OH)_2$	2.5	1210	1275	330	79

Part 2—With 70 Parts HPC (70/298 Cure)

None	..	....	85	220	54
DPG	1.0	1170	1560	410	81
DOTG	1.0	1230	1640	420	81
Dodecyl Amine ..	1.0	300	435	540	70
Dibutyl Amine ..	1.0	190	225	540	66
20% aq. NaOH...	1.0	255	325	530	67
$Zn(OH)_2$	5.0	....	100	240	59
$Ba(OH)_2$	5.0	410	525	420	70
$Ca(OH)_2$	5.0	405	545	470	68

*Base stock same as that used in other tests.

show that the tensile does not begin to drop rapidly until pH of the black mixture falls below 6. Above this value good vulcanizates are obtained.

In view of the results shown by mixtures of blacks as far as pH of the blacks on stock curing qualities is concerned, it should be possible to accelerate the cure of channel black-Thiokol FA stocks. A number of alkaline materials (Table II), were added to the base stock with this idea in mind in HPC and MPC black loaded stocks. The guanidines (DPG and DOTG) were found to increase the curing rate of both types of black to the point where satisfactory vulcanizates were obtained.

Organic amines and inorganic hydroxides were not effective buffers and generally had no effect on rate of cure in the MPC black stock with the exception of dodecyl amine which retarded slightly and calcium hydroxide which accelerated slightly. In the HPC black stock which did not show any cure, all buffers showed some improvement in cure. As would be expected, HPC black requires more buffer than the MPC black. For the guanidines this amounted to twice as much buffer for the lower pH HPC black.

While all data reported here is based on laboratory mixed batches, experience on factory mixed stocks indicates that the same differentials between blacks exist, even though tensiles on factory processed stocks are generally slightly lower than those found in the laboratory.

In conclusion it may be stated that three methods have been suggested by which higher tensiles may be obtained in Thiokol FA vulcanizates. These are:

1. Reinforcement by FF blacks or, stated more generally, by alkaline fine particle blacks.

2. Reinforcement through the use of mixtures of SRF and channel blacks.

3. Reinforcement by channel blacks alone using alkaline buffers such as guanidines to overcome the retarding effects of channel blacks.

Buna S and Milkweed Rubber

IN a Buna S-carbon black compound made at the rubber laboratory of the National Research Council, at Ottawa, Canada, as recently reported by T. R. Griffith of that laboratory, 2 parts of pine tar and 2 parts of stearic acid were used on 100 parts of Buna S. The compound had excellent tear and flexing resistance and the heat embrittlement defect inherent in Buna S was greatly improved. The compound is under further investigation. If 15 parts of milkweed rubber are substituted for 15 parts of the Buna S, Mr. Griffith reports, so that the compound contains 85 parts of Buna S and 15 parts of milkweed rubber, there is a still greater improvement in the properties mentioned.

Building tack is also imparted by the milkweed rubber, although there is a drop in resilience and tensile strength. Milkweed rubber nevertheless is said to show promise of overcoming to a certain degree an inherent defect of Buna S and is one illustration offered by the National Research Council of the manner in which compounding research may broaden the field of usefulness of a synthetic. The research connected with the extraction of the milkweed rubber from the plant is being carried out by the Biology Division of the Council.

BACK THE ATTACK

BUY WAR BONDS AND STAMPS

Editorials

Tariff Question

THE confusion which marked the launching of the synthetic rubber program in the United States —charges and counter-charges, investigations, indictments, and what-not—bids fair to return to our midst. Once again conflicting statements are appearing in the daily press and once again the lay public is at sea as to where we stand on the overall rubber question. The industry, of course, can easily grasp the situation, knowing that increasing supplies of synthetic rubber, now running at about 40,000 tons a month, does not necessarily mean the return of civilian goods, particularly tires, but the public does not, nor does the reappearance of conflicting statements help the situation.

In particular, the public is beginning to wonder about the future of the newly-created synthetic rubber industry which represents an investment of some $750,000,000. Even before this investment can begin producing dividends in the form of crucially needed supplies of rubber there is talk—serious talk—of liquidating the industry. Vice-President Wallace started this talk several months ago when he intimated that the synthetic rubber program was a war emergency measure only, and warned that any tariff on crude rubber erected in the post-war period to protect the domestic synthetic rubber industry would be an invitation to World War Three. More recently, President Roosevelt has gone on record as opposing any such tariff, stating that there is little question but that major efforts to impose a tariff will be made soon after the total defeat of the Japanese in the Pacific.

There are strong indications that the synthetic rubber industry will soon become a political football, with the Republican party making an issue of its post-war fate. A declaration that the industry should be given "adequate protection" after the war to survive and continue operation was made by Representative Joe Martin, Republican leader in the House, shortly after President Roosevelt's statement that he opposed a tariff on crude rubber. It is significant that the Republican spokesman did not use the word "tariff" but signified "adequate protection" which lends credence to the growing belief that the synthetic rubber-crude rubber question should be settled in peace negotiations, rather than through a tariff duty.

It is, of course, quite possible that while the President is opposed to a tariff he will advocate a subsidy and thus maintain sufficient synthetic rubber production, say 300,000 tons a year, to protect the American rubber manufacturing industry against any exorbitant prices which might be attempted on crude rubber in the future. It has been suggested in some quarters that the subsidy question is one key to the President's declaration of purpose on the rubber tariff. Else, it is argued, why should Mr. Roosevelt raise the question of scrapping the synthetic rubber plants at a time when the program is first nearing completion and before it has begun paying real dividends!

Whether synthetic rubber will need any tariff protection in the post-war world is still an academic question. At this stage of the art it is safe to say that by far the greater portion of the rubber manufacturing industry would return instantly to crude rubber if it were again available in quantity, using the synthetic for special purposes only, as in the past. Should the war continue for several years, however, then it is practically certain that the copolymers will have been improved to a point where they will match the characteristics of the natural product so closely that there will be little choice between the two. As for cost, it is still far too early to tell.

Magic Tanks

A NEW device has appeared on the American market—the Magic Tank. This is a tank which is used on passenger automobiles with "A" cards entitled to one and a half gallons of gasoline a week under present rationing regulations and which is miraculously full at all times. These Magic Tanks are to be found on cars in metropolitan areas throughout the country—and should be outlawed. America faces a period where the maintenance of essential transportation will be imperiled unless tire conservation measures are emphatically enforced. Every tire now in use must be carefully preserved if a transportation breakdown is to be avoided. Mileage restrictions were established with this point in mind, yet they are being flagrantly violated. Thousands of motorists possess Magic Tanks. There is an answer—and only one answer—to the problem. We urge Rubber Director Dewey, as we have urged his predecessor, to ban pleasure driving. There is still a war to be won.

CURRENT NEWS OF THE MONTH

FOURTH PROGRESS REPORT STRESSES NEED FOR INSTANT CONVERSION TO SYNTHETICS

ALTHOUGH the supply of tires and other essential rubber goods continues short and will be so for a long time, no one need worry about this country's ability to produce synthetic rubber if adequate feed stocks, fuel and other essential materials and labor are provided, according to the fourth progress report issued by the Office of the Rubber Director. The report, the first to be issued by Col. Bradley Dewey since he assumed the mantle of Rubber Director, was issued on November 10. Discussing the basic situation, the report states that the task of constructing the vast new synthetic rubber industry is nearing completion; the more important processes have been proven; the characteristics of the synthetics are constantly being evaluated for a number of products; and daily the rubber manufacturing industry is improving its techniques for using the new forms of rubber.

Stating that the question as to whether enough synthetic rubber could be produced before our stockpile of crude rubber became exhausted has been answered in the affirmative, the report hastens to point out that the availability of synthetic rubber does not immediately assure an adequate number of tires or other rubber products. The job of translating raw materials into a sufficiency of suitable military and consumer rubber products is under way and the solution is dependent upon management, labor, scientists, and engineers, in and out of the rubber industry.

Four Major Programs

According to the report, the rubber program in the past year presented four major programs: (1) the increase of reclaim rubber production and of retreading materials and facilities; (2) the construction and development of plants to produce synthetic rubbers and their principal raw materials, butadiene and styrene; (3) the expansion of the rubber manufacturing industry to process synthetic rubber into usable products and (4) the expansion and conversion of allied industries to produce the necessary components of rubber goods, such as high-tenacity rayon tire cords, carbon blacks, etc.—materials essential to the making of rubber goods.

The first two programs are effectively behind us, while the other two are under way. Upon the speed of completion of the latter two, together with effective management and a sound manpower and labor situation, depends the time when this country will be able to get enough rubber products to maintain the irreducible needs of modern warfare and essential civilian transportation.

In the meantime the allocation of available tire production as between essential military needs on the one hand and essential trucks and busses on the other will be one of our most difficult problems.

The next six to nine months, according to the report, will be the most difficult. The effect of a global war, the past two years of wear and tear upon existing tires and the necessity, in order to save crude rubber, of building only military and a few most essential tires has emphasized the scarcity of tires. The inventories of tires built up in times of peace have now been drawn down to an irreducible minimum; the requirements of the military forces are tremendous and have increased materially, and while new production will increase, it will have to wait for the gradual installation and manning of the expansions of other programs.

A shortage of rayon tire cord has required, and continues to require, an excessive use of crude rubber. In the meantime, the greatest conservation must be maintained. For a long time to come, recapped tires must continue to carry much of the transportation burden.

Synthetic Plant Program

In reviewing the synthetic rubber plant program, the report reveals that as of October 31, 1943, the program had progressed to the point where completed plants had a rated annual capacity of 646,000 long tons (585,000 tons of Buna S, 21,000 of Butyl, and 40,000 of Neoprene). As of the same date 87% of the butadiene-from-alcohol plants were completed and 39% of those producing butadiene from petroleum.

One of the reasons advanced for the greater portion of butadiene-from-alcohol facilities completed is that the three such plants located at Institute, Louisville and Pittsburgh (Kobuta) are made up of 11 identical 20,000-ton units which involved only one design problem and simplified building of duplicate units.

Other points stressed in this section of the report included the following: (1) The butadiene-from-alcohol plants have given an excellent account of themselves; (2) Disappointments have been encountered in the production of Butyl rubber and pending results of intensive research production is negligible; (3) All Neoprene plants have been completed and are producing at rated capacity; (4) Some plants have encountered varying degrees of difficulty in starting up; (5) Barring unforeseen developments, existing plants will produce enough synthetic rubbers to keep the rubber manufacturing industry operating at its present limited capacity.

Manufacturing Facilities

Discussing the expansion program necessary to meet both military and essential civilian rubber products next year, the report points out that such expansion is essential because pre-war facilities and equipment left in place are now entirely insufficient to meet the new demands. Only two new rubber fabricating plants are now scheduled to be built, while the balance of the program, in which the industry will invest over $70,000,000 of its own capital, calls for expansion of existing plants at established locations and installation of new milling and processing equipment.

However, the report points out, expansion of plant facilities alone will not produce the volume of tires and other products needed to support the war. Greater output per-man-hour on the part of labor, reduction in absenteeism, more efficient flow of materials, better management planning, and improved distribution of manpower are all essential to this program. Labor and management are working together and it is to be hoped that improved results will come from their cooperative action.

With the engineering of the projects largely finished and the approvals of various parts by the War Production Board secured, the program should move full speed ahead. Even with their high priorities, their completion will require from four to twelve months. Not for a year will the fully expanded output of the industry be realized.

Crude and Scrap Rubber

The most important concern of the Rubber Director's office, the report continues, has been and is the conservation of the crude rubber stockpile, and to that end conversion of products to synthetics has been put into effect as quickly as re-

search has solved the problems involved and synthetics become available. It is now expected that imports of natural rubber for 1943 will total 60,000 long tons and that imports in 1944, augmented by increased shipments from British territory, will be about 80,000 tons.

The supply of scrap rubber on hand is quite satisfactory. As of September 30, 1943, this amounted to approximately 754,000 tons, including 463,000 tons of pneumatic tire grades of scrap. Monthly usage of scrap was set at about 35,000 tons. Last year's tire collection plan brought in approximately 12,000,000 tires. A large part of the miscellaneous scrap turned up as a result of the campaign, however, will have to be destroyed by burning or otherwise.

The reclaiming and recapping branches of the industry received special commendation in the report which stated that at the close of 1943 there will have been distributed approximately 167,000,000 pounds of camelback for the recapping of passenger car tires and 59,000,000 pounds for truck, bus and Army tires. This compares with a total of approximately 105,000,000 pounds of all types of camelback distributed in 1943.

Tires and Rationing

By the end of 1943, according to the report, a total of 17,200,000 tires of passenger car sizes will have been distributed, made up as follows: 5,000,000 new synthetic tires; 4,500,000 pre-Pearl Harbor tires; 1,700,000 war tires made from reclaimed rubber; 3,800,000 used tires recovered from the collection of tires made last year; and 2,200,000 "emergency" tires which are serviceable for short distances only. This total is equivalent to 12,000,000 new tires in service performance, and compares with approximately 50,000,000 tires distributed a year before the war.

Nation-wide surveys show that the tires on passenger cars, light delivery trucks, taxis and farm vehicles are showing serious wear. The accumulated deficit together with less-than-normal obsolescence of cars, indicates a need for new tires of this type in 1944 of at least 30,000,000. While this may sound like a large number, the report points out that the country will have been on a starvation diet for three years, inasmuch as only 4,700,000 tires were released in 1942.

Reviewing the rationing program, the point is stressed that the program is constantly changed to meet current trends, but that present restrictions may be expected to remain in effect until such time as the production of synthetic tires is of sufficient volume to warrant a relaxation of the eligibility requirements.

Conversion to Synthetics

Discussing the conversion program, the report reveals that the entire production of neoprene is now being used in products where conversions have already been made, and that additional products using this material have been developed so that as certain military products are discontinued the production of this rubber can be fully utilized. Despite the fact that Butyl rubber has been available only for experimental and development work, many products have been developed to replace natural or other synthetics with Butyl as soon as it becomes available in quantity.

Obviously, the largest use of rubber is for tires, tubes, and other automotive products. Buna S is carrying this load. At the moment the rubber industry has converted many such products in whole or in part to Buna S, so that:

A. The use of Buna S is now standard for the production of tires for passenger car sizes, motorcycles, industrial tractors, farm tractors and implements, wheelbarrows, bicycles, and truck and bus tires of the smaller sizes.

B. Except for certain over-the-road bus and truck tires, varying combinations of synthetic and crude rubber (10% to 30%) are being used on 10-ply 7.00 tires and on all mud and snow and standard highway 7.50 to 10.00 tires.

C. Up to the present time no synthetics are being used (primarily due to a shortage of rayon tire cord) in most sizes of highway truck and bus tires which are used in high speed, heavily loaded service, in truck and bus tires over 10.50 in size, in earth mover, rock service, logger tires, mud and snow tires 18.00 and larger, and in airplane tires of the larger sizes.

Some of the products mentioned above will have the synthetic rubber content increased by January first. Many other conversions already approved by the Armed Services and by industry will be made effective as soon as more rayon tire cord is available.

Whereas steady progress is being made in the conversion program, there are some properties of Buna S which result in the generation of excessive heat and make it doubtful if complete conversion to the synthetics can be effected until new polymers have been further developed and fully proven.

The problem of converting tubes to synthetic rubber has been made especially difficult because of the shortage of Butyl rubber. Buna S is being used in tubes for passenger car, motorcycle, farm, truck and bus, and military tires. Crude must be used in certain tubes until Butyl or some other such rubber is in greater supply.

Synthetic rubber has now replaced crude for camelback used in retreading truck tires and approximately 40% of synthetic rubber has been added to reclaim to improve quality of recapping in all other types of tires.

Larger quantities of special purpose rubbers, such as Buna N, are being used. They are becoming of increasing importance because of their excellent special properties.

Other Factors Discussed

The Fourth Progress Report, in addition to the items previously covered, also deals with other factors, including the performance of synthetic rubber products, research and development, manpower, feedstocks, costs and prices of synthetics, and patent agreements. In discussing the cost of present synthetics, it is stated that certain combinations of low cost raw materials probably will give direct cost for Buna S that will be less than 15c per pound.

(EDITOR'S NOTE: It is with sincere regret that paper conservation measures and space limitations make it impractical for us to reproduce this Fourth Progress Report of the Office of the Rubber Director in full. The report contains a number of statistical tables and charts which are of special interest to the rubber manufacturing industry. We urge every manufacturer to secure a complete copy of the report by writing direct to the Office of the Rubber Director at Washington, D. C.).

QUESTION OF TARIFF TO PROTECT SYNTHETIC RUBBER INDUSTRY RAISED

Several months ago Vice-President Wallace, in an article in the *New York Times Magazine*, touched off some political bickering with the statement that to raise a virtual embargo on crude rubber from the Far East in the postwar period through the means of a high tariff was tantamount to inviting World War Three. Events in the past several weeks indicate that the question of such a tariff may soon become a political football.

On October 15, at his usual press conference, President Roosevelt predicted that efforts would be made after the war to erect a tariff wall against natural rubber to protect the fast growing synthetic rubber industry. He added that he hoped such efforts would fail, stating that such a tariff would mean "that every man in the United States who owned a car would have to pay 50% more for his rubber." The President said that he believed in cheap tires, and more of them, and that the only way to get cheap tires is to use the tires that are made by nature "whether it be rubber, guayule or cryptostegia."

A few weeks later, in a speech delivered before the Republican Club in Cumberland, Maryland, Representative Joseph Martin, Republican leader of the House, took issue with the President's statements, pointing out that we have spent $625,000,000 to build up the synthetic rubber industry in the United States and that "we cannot expect to take full advantage of our new discoveries and our opportunities if we throw them away." He argued that our good will to other countries can be shown "without destruction of a new and vital

American industry." Representative Martin did not sponsor a high tariff on crude rubber in his address, but was emphatic in his remarks as to the folly of destroying any synthetic rubber plant facilities in the postwar period.

Another subsequence of the President's statement was the announcement in Washington on November 8 by Representative Karl Stefan (Rep., Nebraska) that he planned to launch a move to prevent scrapping of the synthetic rubber industry after the war when crude supplies shall become again available. The Congressman made the startling charge that synthetic rubber is being produced for 5 cents a pound in the government-owned plants. Little credence was placed by government or industrial authorities on this claim. One Akron rubber official, refusing to be quoted, said that it might be possible to claim such a figure if the initial investment was not counted as carrying charges to figure in the per pound cost.

Two More Plants Started

While the tariff question was posed in Washington, two additional copolymer units were formally placed in operation in the past few weeks. On October 14 the 30,000-ton plant at Louisville, Ky., operated by the National Synthetic Rubber Corp., was put into operation. This is the corporation formed by Goodall Rubber, Hamilton Rubber, Hewitt Rubber, Lee Rubber & Tire and Minnesota Mining & Manufacturing, of which W. W. Benner, of Lee Rubber, is president, and Dr. B. J. Oakes, of Minnesota Mining, is executive vice-president and general manager. Officials of the five companies were present at ceremonies held in connection with the opening of the Louisville unit.

The second unit put into operation was that built and operated by Goodyear near Houston, Texas. This unit, with a production capacity of 60,000 tons per year, was formally opened on November 17. Several hundred Goodyear tire dealers from Texas and Oklahoma districts joined businessmen and civic leaders on an inspection tour of the plant at the opening-day ceremonies. A large group of Goodyear officials, headed by Vice-President R. S. Wilson, were present. A feature of the program was a complete display of synthetic rubber products, including tires, belts, bullet-sealing fuel tanks, and miscellaneous molded goods.

Butadiene Developments

The Neches Butane Products Co., the company organized by five oil companies to aid the synthetic rubber program, has announced that the first of two units now almost completed at Port Neches, Texas, to produce butadiene will be placed in operation in mid-December, and that the second unit will be ready shortly thereafter. This two-unit plant will provide enough butadiene to produce one-seventh of the entire wartime requirement of synthetic rubber.

According to the company's announcement, through a radically new process the amount of butadiene to be manufactured from a barrel of oil will be more than doubled and the refinery gases remaining after the butadiene has been manufactured can be used in production of high octane gasoline and other products. The process, turned over to the Government, has already been found practicable in smaller plants.

In the operation of the Neches plant, refinery gases produced in the manufacture of petroleum products will be piped to the plant from nearby refineries of the five participating companies—Atlantic Refining, Gulf Oil, Pure Oil, Socony-Vacuum Oil and the Texas Company. After the production of the butadiene, the remaining gases will be returned to the refineries for the production of high octane aviation gasoline and other products. The gases, or raw stock, will be supplied to the Government on a cost-of-production basis.

The plant will have a capacity of 100,000 tons of butadiene a year, sufficient to produce more than 110,000 tons of synthetic rubber per year. None of the companies participating in its operation will receive any profit or management fee of any kind.

The butadiene plant operated in Los Angeles by the Southern California Gas Co., the fumes of which recently caused a public clamor for its closing, is being redesigned to operate with a closed heat exchanger system, which is expected to eliminate the fumes entirely. The City of Los Angeles filed an injunction suit against the oil company on October 20, asking that the plant be closed, but after a flying visit to the Coast by Rubber Director Dewey it was decided to lift the suit. The Rubber Director promised that the nuisance would be eliminated by December 1 or he would close the plant without court proceedings.

On October 19 the Petroleum Administration for War called upon refiners and natural gasoline manufacturers to increase the quantity of butylene and isobutane to be made available for war needs, particularly in the manufacture of synthetic rubber and aviation gasoline. Action was taken by issuing PAW Directive No. 75, which requires that butylenes and isobutane be used only in the manufacture of these two materials or their components. The directive also requires manufacturers to inform the petroleum administration of the quantities and composition of their hydrocarbon mixtures containing butylenes and isobutane that are not now being so utilized.

Because of the greatly increased demand for alcohol for butadiene needed for synthetic rubber production, the stockpile of industrial alcohol is reported being dangerously drawn down. WPB recently revealed that, as of July 30, the stockpile of 190 proof ethyl alcohol amounted to 138,000,000 gallons and, despite the increasing production by the beverage distilling and regular industrial

Rubber Director Bradley Dewey and John L. Collyer, president of the B. F. Goodrich Co., inspecting a strip of GR-S made at one of the Akron plants operated for the government by Goodrich. Col. Dewey made a flying visit to Akron early this month to discuss the tire situation with leading manufacturers. It was his first trip to the Rubber City since he succeeded William Jeffers as Rubber Director.

alcohol producers, it is expected to fall below 100,000,000 gallons before the end of the year.

Walter G. Whitman, assistant director of the WPB Chemicals Division, testified before the Gillette Committee in Washington on October 14 that 410,000,000 gallons of industrial alcohol will be needed in 1943 and 640,000,000 gallons in 1944. Whereas the 1943 synthetic rubber program called for 130,000,000 gallons this year, he stated, it will require about 330,000,000 gallons in 1944.

New Houdry Process

There is some talk of a new synthetic rubber process developed by the Houdry Laboratories in Linwood, Penna. Using the standard process, a synthetic rubber product could be turned out in approximately 12 hours, but with the new Houdry method, now in the pilot plant stage, it can be turned out in about an hour, according to report. One tire made with synthetic rubber produced under the new method, it is said, was run 7,000 miles before it failed.

As near as can be determined, the same ingredients used to make the standard GR-S—butadiene and styrene—are used in the new process, but the method represents the departure. Whereas standard operations employ a batch operation for mixing the butadiene and styrene, the new Houdry process represents a continuous method. Only one piece of equipment is required, according to report, and that is a cylinder into which the raw ingredients are fed at one end, emerging as synthetic rubber at the other.

To Produce in England

According to reports from England, the British Government has granted a license to the British Celanese Company for the large-scale production of synthetic rubber in that country. The decision, urged by several members of Parliament for some time, indicates a change in the Government's viewpoint.

The Government, through its spokesmen, has long held that mass production of synthetic rubber was unjustifiable in England, since the country's needs for rubber could be met from natural rubber supplies still available in the Empire and by synthetic rubber from the United States.

An official announcement on the decision to allow British Celanese, long a producer of plastics, to manufacture synthetic rubber, and by what process, is expected to be made in the near future.

COATING, FABRICS AND SERVICES NOW UNDER SIMPLIFIED REGULATION

Maximum Price Regulation 478 (Coated and Combined Fabrics) was issued by OPA on October 15 and became effective on November 1. The new order provides specific formulas for determining maximum prices at all stages of the manufacture and wholesaling of coated and combined fabrics and the coating and combining of fabrics and establishes ceilings about the same as those previously prevailing.

Covering a wide variety of fabrics, M.P.R. 478 was adopted to bring all types of coating, coated fabrics, and coating services under one all-inclusive, simplified regulation and to remove a number of additional items from control of G.M.P.R. Ceilings for products covovered by M.P.R. 478 formerly were established by G. M. P. R., M.P.R. 157, and M.P.R. 220; and maximum prices for services covered by the new regulation formerly were fixed by M.P.R. 128.

The different operations of producers, converters, job coaters, job combiners, and wholesalers in the coated and combined fabrics industry in many cases are performed either partly or altogether by a single firm. Under the new regulation, a firm which performs more than one function may determine its maximum prices under this regulation instead of under any or all of the four regulations previously in effect.

The price ceilings for the products and services covered by M.P.R. 478 are established by reference to two base periods: April, 1943, for products and services either sold directly to the United States or foreign governments or employed in the manufacture of commodities covered by M.P.R. 403; and March, 1942, for all other fabrics and services covered by the new regulation.

The ceilings for fabrics and services dealt in by a manufacturer during the base period are, in general, the highest prices which the manufacturer charged during the base period for the same fabric or service to the same class of purchasers.

In the case of fabrics or services containing or requiring the use of synthetic or substitute rubber, the prices must be decreased to reflect recent decreases in the cost of such rubber.

The regulation considers several categories of fabrics and services other than those identical to a fabric or service sold during the base period to be the "same" as a base-period commodity for pricing purposes and these are listed in the regulation.

In cases of substitutions of Buna S (GR-S) and Butyl (GR-I) for natural rubber, the regulation makes no change in the maximum price of the fabric or service because prices of these synthetic rubbers have been established at such a level that the cost of producing fabrics from them is approximately equal to that of making them with natural rubber.

A special pricing formula is provided in the regulation for fabrics or services different from those dealt in by the manufacturer during the base period and maximum prices for sellers other than manufacturers are to be determined by applying a percentage mark-up to the seller's purchase price.

M.P.R. 478 provides for application of individual price adjustments in the case of essential suppliers of essential fabrics or services, this provision being included as a safeguard against any possible stoppage of essential military or civilian fabrics or services. A special pricing procedure is set up for fabrics where a government procurement agency supplies the fabrics.

A model form upon which manufacturers should report to OPA on maximum prices determined by them on new fabrics or services and forms for making applications for price adjustments on different types of fabrics and services are supplied in an appendix to the regulation.

The first meeting of the Coated and Combined Fabrics Industry Advisory Committee was held in Washington on October 21. Besides discussing the coverage, reporting requirements, and other features of the regulation, the committee organized and elected E. S. Nickerson, E. I. du Pont de Nemours & Co., New York City, chairman; E. A. Clare, Athol Manufacturing Co., Athol, Mass., vice-chairman; and A. W. Hawkins, Brunsene Co., East Cambridge, Mass., secretary-treasurer.

Besides this meeting, OPA called general meetings for the industry in other cities for the purpose of discussing the regulation.

MECHANICAL GOODS

Specific maximum prices for several kinds of rubber hose and belting were established by OPA on November 4 in Amendment No. 15 to M.P.R. 149 (Mechanical Rubber Goods), which became effective November 9. The action was taken to replace individual maximum prices which had to be determined separately by each manufacturer. The specific maximums are intended to provide more effective control of prices and to supply a method of determining ceilings that can be applied more easily by the industry.

According to OPA, the action accomplishes the following:

1. Gives specific amounts which may be added for each additional ply in pricing Grade 1 neoprene conveyor belting of thicknesses greater than six plies. They apply to belting made with 28 or 32 ounce duck fabric.

2. Provides that maximum prices for Grade 1 neoprene conveyor belting made with a 33 or 35 ounce hard duck, or with a 36, 42, or 48 ounce soft duck, shall be established by adding a specified amount to the maximum price of 28 ounce duck belting with the same cover thickness.

3. Makes maximum prices for Grade 1 neoprene conveyor belting applicable also to Grade 1 neoprene elevator belting, as both kinds of belting are of the

same basic construction, and customarily are sold at the same price.

4. Gives specific maximum prices for Grade 1 neoprene transmission belting made with a 33 to 35 ounce hard duck, or a 32 ounce soft duck.

5. Sets maximum prices for winterized wire brade Buna N high pressure hydraulic control hose which were calculated by averaging the manufacturers' individual maximum prices.

6. Makes maximum prices identical for two different sizes of air and air tool hose Grade 1 (molded-braided type). This was done by averaging the two different maximum prices already in the regulation for the two sizes. This restores a former trade practice, as the two sizes customarily had the same price when they were produced from natural rubber.

DRUG SUNDRIES

Maximum prices were established by OPA on November 2 through Amendment No. 12 to M.P.R. 300 (Maximum Manufacturers' Prices for Rubber Drug Sundries) for the war model (Victory Line) items manufactured from Buna S or Butyl and for certain types of rubber drug sundries now allowed to be produced out of synthetic rubber which for some months have not been manufactured because of crude rubber restrictions. In both cases, temporary changes in specifications are provided. The amendment became effective November 6.

The synthetic rubber drug sundries which are comparable to pre-war production, but which are not included in the Victory Line, are given the same maximum prices as those for the comparable pre-war items made of natural rubber. Those were prices established on the basis of December 1, 1941, prices. It is provided that Buna S or Butyl molded hot-water bottles, fountain syringes, and combination syringes, Consumer Grade I and II, shall be priced as Victory Line rubber drug sundries even though they do not meet all the ordinary specifications for Victory Line items made of natural rubber.

The specifications provided in the amendment are temporary in character, according to OPA, because the industry has not had sufficient production experience with synthetic rubber to provide all the data that is needed.

ELASTIC THREAD

All restrictions on the manufacture of elastic thread made with synthetic rubber have been suspended until April 1, 1944, and its use permitted in the production of elastic fabrics through amendments, issued simultaneously by WPB on October 18 to Order M 124 (Rubber Yarn and Elastic Thread) and Order M 174 (Elastic Fabrics, Knitted, Woven or Braided).

The action was taken following the receipt of information from the ORD that adequate supplies of synthetic rubber are on hand for use in yarns and fabrics and clears the way for eventual use of synthetic rubber in such items of clothing as garters, suspenders, foundation garments, and underwear.

At present, neoprene will be used for the most part, but officials said that changing trends in supply might result in a shift to some other type of synthetic. No elastic fabric has been available for civilians since March 29, 1942. Officials cautioned against too optimistic a view of the effect of this action, but it is hoped that the yarns and fabrics will be available in good quantities sometime during the first quarter of 1944.

On October 28, WPB revoked Order L 137 (Sanitary Belts and Supports) and amendments to L 90 (Corsets, Combinations, etc.), thereby removing all restrictions on the amount of elastic fabric to be used in girdles, corsets, combinations, sanitary belts, garter belts, and brassieres. The only restriction still in effect limits quarterly output of corsets, combinations, and girdles to 75% of 1941 first quarter production. The move completed the pattern for production of elastic type garments made possible by the increasing supplies of synthetic rubber.

RUBBER FOOTWEAR

Retail and wholesale maximum prices for men's black 10-inch lace mine pacs, a kind of waterproof rubber footwear whose production was authorized recently by WPB, have been established by Amendment 8 to M.P.R. 229 (Retail and Wholesale Prices for Victory Line Waterproof Rubber Footwear). OPA also amended the manufacturers' regulation for waterproof rubber footwear and Amendment 4 to M.P.R. 132 (Waterproof Rubber Footwear) makes two changes, both of which are of interest solely to the trade. Both amendments were issued October 16 and became effective October 22.

In M.P.R. 132, the manufacturers' ceiling prices for men's molded sandals, men's clogs, and women's footholds are changed from a list price basis to a net price basis. Because of the difference in composition of Buna S (GR-S) synthetic rubber from other compounds, the amendment to M.P.R. 132 frees manufacturers from the requirement to meet certain physical and chemical specifications for compounds containing Buna S when the compounds are used in articles listed in Appendix A of the regulation. A similar waiver already existed for items listed in Appendix C, so that the amendment merely makes the two provisions consistent.

According to an announcement by OPA on November 2, a new supply of children's non-leather shoes for general wear will be available ration-free about the first of the year, providing some relief to the shortage of youngster's shoes. Although the shoes will have canvas uppers, they will not be ordinary gym and tennis types. The soles will be made from remnants and other available materials, principally heavy woven fabric, reinforced with vulcanized rubber. OPA has also provided for the ration-free sale of the small available stocks of gym and tennis shoes with rubber soles and canvas uppers.

A survey of the civilian shoe situation recently made by OPA is said to have indicated that in most sections of the country there is a ready market for children's rationed shoes with synthetic rubber soles. This trend indicates that the wear value in these soles will make them generally acceptable and thus will do much to relieve the leather sole shortage.

RUBBER IMPORT FIGURES RELEASED BY RUBBER DEVELOPMENT CORP.

The first official release of figures covering the importation of crude rubber from any source since the entrance of the United States into the war has been made. In a statement issued in Washington on November 9 by Robert O. Case, assistant to the president of the Rubber Development Corporation, it was revealed that wartime imports of rubber of all types from Central and South America increased 145% in the first nine months of the current year as compared with the corresponding period of 1942.

The statement indicated that imports from Brazil, Bolivia and Peru showed a 190% increase for the period, jumping from 3,355.5 tons in the first nine months of 1942 to 9,471 tons for the 1943 period. Guayule imports from Mexico increased from 3,688 to 5,593 tons; imports of all rubbers from Central America from 159.4 tons to 1,903 tons; other American sources from 769.5 tons to 2,332.8 tons. In the aggregate, imports increased from 7,972.4 tons in the first nine months of 1942 to 19,569 in the 1943 period.

Although it has been known for some time that England was sending supplies of crude rubber through to the United States, official acknowledgment of such shipments was made in England on October 13 when Oliver Lyttelton, British Minister of Production, in a statement made to Commons, said that stocks of crude rubber in Britain available for blending with synthetic rubber from the United States were sufficient not only to meet England's need but also to permit a substantial quantity of natural rubber to be exported to America. No figures were cited.

Latin American Developments

A group of American newspaper men recently concluded a tour of Latin America under the auspices of the Rubber Reserve Co. to study the rubber collection efforts at close hand. A number of interesting stories have resulted, particularly those by Luther Huston in the *New York Times*, Russ Symontowne in the *New York Daily News*, and Charles C. Miller

in the *Akron Beacon Journal*. These stories, which for the most part trace the activities which have been launched in Latin America by the Rubber Reserve Co. and other government agencies, have aroused a good deal of comment in rubber circles.

Although these reports differ widely in their telling, the newspaper writers seem to be fairly well in agreement that while increased production of rubber has been brought about by the activities of American agencies in South America, that country cannot now or in the predictable future come anywhere near supplying the world market for natural rubber. Several of the reports were severely critical of the high cost being expended for each pound of rubber secured.

In the meantime, the following recent developments have come to light:

Brazil: A new rubber price agreement is reported to have been signed between the Rubber Development Corp., which now comes under the Office of Foreign Economic Administration, headed by Leo Crowley, and the Brazilian Government. The agreement is said to be retroactive to July 1, 1943, and to stipulate a price rise from 39c to 45c a pound.

Bolivia: Rubber output is reported to be expanding rapidly in the remote Beni area of Bolivia and the country's rubber production soon may be setting new records. New rubber producing areas are being opened in the Beni and Santa Cruz provinces and much remote territory is being explored for rubber with the aid of air transportation. A good quantity of Hevea trees has been found, for example, in the Huachi Lake area.

Haiti: The American Department of State has disclosed that the Rubber Development Corp. will spend about $9,000,000 during 1944 to produce cryptostegia rubber in Haiti. The program is reported to have received a good start and Haitian officials believe it will hit its stride about mid-1944.

Mexico: A new agreement between the United States and Mexico, providing for a larger supply of Hevea rubber from the United States in return for delivery of all Mexican guayule, is reported to have been signed recently. Under the new agreement, it has been reported, Mexico will receive 4,500 tons of rubber from the United States, consisting of 1,800 tons of tree rubber, 1,800 tons of synthetic rubber, and 900 tons of reclaimed rubber. Locally produced crude rubber will be deducted from the imported crude rubber allotment.

Nicaragua: According to a report from Managua, the agreement under which the William Wrigley Co. was gathering wild rubber in Nicaragua for the Rubber Development Corp. has been ended by joint agreement, and Rubber Development will carry on its own collections in the future. The agreement was originally signed to take advantage of the chewing gum company's experience in the harvesting of chicle.

NOVEMBER QUOTAS SET BY OPA INDICATE SEVERITY OF TIRE SITUATION

The seriousness of the tire shortage situation is reflected in the November quotas announced on October 29 by OPA. As compared with October, there will be available for rationing during the month 30% fewer new tires for trucks and 14% fewer new tires for passenger cars.

The extent of the cut in new truck tires is indicated by a November quota of 290,245 as against 416,613 for October. The new passenger car tire quota was reduced from 645,050 in October to 553,688 in November.

At the same time, OPA increased by 28% the quota of used or recapped passenger car tires (Grade III), from 648,000 in October to 829,650 for November. Representing the only increase in the November quotas for tires and tubes, this action is designed to accommodate the anticipated greater demand for used tires resulting from the scarcity of new tires.

The November quota of farm tractor and implement tires was cut to 46,000 from 59,800 in October. The quota of new passenger tubes was shaved to 645,494 from 652,374 in the previous month, while the November figure for new truck tubes compares with 361,660 in October.

The gravity of the truck tire supply situation was reflected in a memorandum in which OPA informed its rationing organization that "the nation is confronted with a serious truck tire shortage and the local boards will have to use all of their ingenuity to avert a serious mass transportation breakdown." It was pointed out further that acceptance of recapping service certificates is a necessary conservation measure.

Regional and district offices were directed to "hold on to their meager reserves of new truck tires and new passenger tires to meet those situations where eligibles are actually forced off the road because of a lack of tires."

Forecasting that the December quotas on new passenger and truck tires will remain at approximately the November level, OPA stated that the country faces a shortage of new tires until synthetic tires can be produced in adequate quantity to replace the dwindling supply of present tire stocks.

Since October 1, only those car owners who need to drive a minimum of 601 miles a month have been eligible for new passenger tires. OPA stated that the November supply should provide for these eligibles.

Reconversion Activities

Efforts to increase the production of civilian tires, in keeping with the program established by the Rubber Director's office, continue to be made by the industry. Goodyear has moved some of its operations out of Akron to its New Bedford and Lincoln, Neb., plants; Seiberling has followed suit, as have other companies in the Akron area, including Goodrich. General Tire is rushing plans for its new plant at Waco, Texas.

Reconversion of former tire plants is also continuing apace. The Kelly-Springfield plant at Cumberland, Maryland, has already switched the greater proportion of its productive capacity back to tires, and at least 500 former tire workers are again back at their old jobs. According to Kelly-Springfield officials, synthetic tire production at that plant will soon exceed pre-war output. As a result of Firestone's transfer of its self-sealing gasoline tank division to a leased plant in Zanesville, Ohio, about 1,000 Akron workers have been released for work on civilian goods.

Goodyear Expanding Plants

Contracts have been let by Goodyear for the construction of a 256,000 square foot addition to its Gadsden, Ala., plant as part of its $30,000,000 expansion program for the manufacture of tires. Plant additions have been held to a minimum in the Goodyear program, the bulk of the expenditure being devoted to new processing equipment which is being or will be installed in existing buildings. Needed additions at the Gadsden, Ala., and Jackson, Mich., tire plants and the Decatur, Ala., fabric plant are the major exceptions to the rule. P. W. Litchfield, chairman of the Goodyear board, announced on November 10 that one tire plant which had been converted to the manufacture of three-inch cannon and another which had been converted to the manufacture of machine gun bullets are now being reconverted to tire production.

In connection with the new tire plant being constructed at Waco, Texas, for General, it is interesting to note that a special meeting of the company's shareholders was called for November 19 to authorize new preferred stock. The Waco unit will have a capacity of 3,500 tires per day and is being erected at a cost of $4,000,000.

On November 2 Seiberling announced that it had entered into a contract to sell $1,500,000 worth of 4% sinking fund debentures to the Mutual Life Insurance Co. of New York to create an expansion fund to be devoted to increasing tire and tube manufacturing facilities at its Barberton, Ohio, plant. For some time Seiberling has been moving portions of its war production out of Akron to create more room for tire output.

The huge airplane tires now being made have increased the average of fabric per unit to more than three times what it was in peacetime. In line with the government's program for more rayon and cotton tire cord for both military and essential civilian transportation needs, the U. S. Rubber Co. has reconverted two more of its textile mills from the manufacture of duck to tire cord production,

according to H. Gordon Smith, general manager of the company's textile division. These mills are located at New Bedford, Mass., and Shelbyville, Tenn., respectively, and make a total of four operated by the company, including one at Hogansville, Ga., and another at Winnsboro, S. C., that are now devoted to tire cord production.

The B. F. Goodrich Co. is expected to resume soon at Akron the partial production of such items as rubber gloves, heels, and raincoats.

Amendments to Ration Order

Three additional amendments to Ration Order 1-A (Tires, Tubes, Recapping, and Camelback) have been issued by OPA since our last report, as follows:

Amendment No. 57, issued October 14 and effective October 19, specifically limits a dealer in the number of new tires and tubes he may acquire in a particular group of products to no more than the number he sold during the preceding 60-day period or to a number no larger than one-third of his total unit sales during the 180 days preceding his order, whichever is greater. A certification to this effect must accompany his purchase order.

Amendment No. 58, issued October 28 and effective November 1, establishes the eligibility of commercial vehicles used for delivery of medical supplies, drugs, laundry, dry cleaning (apparel only), and essential foods to receive used passenger tires and used truck tires of sizes smaller than 7.50-20 to replace tires no longer serviceable.

Amendment No. 59, issued and effective November 11, provides that dealers who acquired new tires or tubes without ration certificates under a plan announced last May for getting stocks down to the dealer level as soon as possible may retain the ration currency received from the sale of these tires and tubes. The action was taken to avoid disruption of tire and tube distribution.

Tire Price Adjustment

Sellers of private brands of new tires and tubes have been given a method by OPA whereby they may apply for adjustment of their wholesale ceiling prices for such products when the cost of these products is so high as to wipe out their operating margin. The method is outlined in Amendment No. 8 to M.P.R. 143 (Wholesale Prices for New Rubber Tires and Tubes), issued on November 9 and effective November 15.

The method applies to any private brand owner, except manufacturers, whose total wholesale ceiling price is less than the sum of his supplier's maximum price for the tires or tubes, plus his own actual warehousing and transportation costs.

Need for the provision arose, OPA said, because some tire and tube manufacturers who had been selling below their legal maximum prices now sell at ceiling prices. This has caught some private brand owners in a "squeeze", due to the fact that their maximum prices were set at March, 1942, levels.

At that time their operating margin was adequate because of the lower prices of the tires and tubes they bought. It has, however, proved inadequate to absorb the higher prices charged since in some cases.

Revive Tire Bill

Hearings on the so-called Ellender Tire Bill, now being pushed by Senator Ellender and other members of the Small Business Committee of the Senate, were held in Washington on November 9 and 10. The committee decided not to hold public hearings on the bill, which seeks to eliminate company-owned stores from the retail tire field, but to limit witnesses in executive sessions to two for the proponents of the bill and two for the opposition.

Hearings on the bill were held last April but no action was taken before Congress recessed. An intensive campaign has been going forward in recent months to force action on the bill at the current session. George J. Burger, of New York City, known as an independent tire dealer's consultant, has been prominent in such organization.

The current hearings were held before the Senate Banking Committee. Robert A. Dean, of Louisville, Kentucky, president of the National Association of Independent Tire Dealers, was heard on April 9. He said the operation of company-owned stores had put independents in a position where they could not survive. He also charged that competitive operations among the big four tire companies had resulted in "a monopoly in tire manufacturing and today 90% of the tires produced in America are manufactured by them."

Rubber at N. Y. Shoe Fair

Several interesting exhibits of rubber and rubber substitute products were on exhibit at the Shoe Fair held at the Hotel New Yorker in New York City on October 17 to 20. These included Victory line rubber footwear displayed by Cambridge Rubber, Converse Rubber and other manufacturers, as well as special cements for shoe operations shown by Dewey & Almy Chemical Co. and Latex Process Co., Inc., among others. U. S. Interrub Processes, of 30 Rockefeller Plaza, exhibited the "Ameritread" rand, a rand made of a special rubber compound with high wearing quality, one edge of which is zig zag, in order to permit it to adapt itself to any contour —also around the tip—of soles and heels. The company also displayed its "Ameriflex" sole. Several new types of synthetic soles for non-rationed shoes, including one called "Rubberlyke," were displayed by L. Drexsage Co. Exhibits were also shown by Norwalk Tire & Rubber Co., Atlantic Tubing & Rubber Co., American Rubber Products, and Triplewear, Inc.

COURT UPHOLDS VERDICT IN AMERICAN ANODE SUIT

In accordance with the decision handed down by the U. S. Circuit Court of Appeals for the Seventh Circuit on May 28, 1943, final judgment was recently entered in the U. S. District Court at Chicago in the case of American Anode, Inc., vs. Lee-Tex Rubber Products Corp. The Appellate Court sustained the verdict of the lower court.

In the original suit, American Anode charged Lee-Tex with infringment of the Klein and Szegvari patent (U. S. Pat. No. 1,825,736) and the Twiss patent (U. S. Pat. No. 1,996,051), both of which it owns. Various claims in the respective patents were relied upon in the suit.

Although Lee-Tex based its defense on invalidity and non-infringment of both patents, the District Court found that all the claims relied upon in both patents were valid and that all such claims except one in the first and one in the second patent were infringed upon.

The Klein and Twiss patents relate "to a process for manufacturing rubber goods directly from latex by immersing in the latex forms previously treated with a latex coagulant." The processes covered by both patents are known as the "coagulant-dip" process, by means of which rubber articles are fabricated with but a single dip. The thickness of the article produced, of course, depends upon the length of time the form is left in the latex.

In its defense, Lee-Tex argued that its "commercial" process did not infringe the Klein patent because that patent should be limited to the use of a porous mold and that its "developer" process did not infringe either the Klein or Twiss patents because that process does not produce a layer of rubber by ionic coagulation while the form is in the latex, but rather by dehydration.

In reviewing the appeal the Circuit Court held that "We are convinced that the claims relied upon in both patents are valid and infringed, as found by the District Court."

The Fisk Tire Division of U. S. Rubber has prepared a new manual covering the repair and recapping of tires through the use of synthetic rubber. Dealing with all aspects of recapping, including tire repairing, tube repairing, and curing, the manual was written primarily for Fisk recappers but is available to others on request to Fisk, Rockefeller Center, New York City.

A new synthetic rubber conveyor belt said to be comparable in all respects with pre-war high quality conveyor belts, has been announced by Goodyear. Comparing favorably in flex life, aging, and resistance to abrasion and cutting, according to the manufacturer the new belt has the additional advantages of resisting oil and high temperatures. It is said to be particularly adaptable to all mining operations.

SAFETY COUNCIL REPORTS 1942 ACCIDENT RATES IN INDUSTRY

Accident rates in the rubber industry in 1942, as released by the National Safety Council, show that the total number of man-hours worked by 43 reporting plants was the largest ever reported to the Council. The average frequency rate was 10.06 reportable injuries per million hours worked, an increase of 25% over 1941. Reportable injuries were defined as those which arose out of and during the course of employment that resulted in death, permanent total disability, permanent partial disability or temporary total disability.

The average rise of 25% in frequency from 1941 was one of the largest increases among 32 major industries. The average change for all industries was a decrease of 2%.

The average severity rate was 0.66 days disability per 1,000 hours worked, up 12% from the previous year. This rise also compared unfavorably with the average increase of 3% for all industries.

Net reductions in injury rates since 1926, according to the report, were 63% for frequency and 43% for severity. These decreases were less than the corresponding reductions for all industries. The frequency and severity of all types of injuries increased over 1941. Frequency rates averaged lowest in large plants and severity rates averaged lowest in small units during the past three years.

The frequency rate represents the number of reportable injuries per million hours of exposure and the severity rate the number of days lost as the result of reportable injuries per 1,000 man-hours of exposure, including arbitrary time charges for permanent partial disabilities and deaths, in accordance with the standard scale.

The least serious but the most numerous reportable injuries—temporary total disabilities (those which in the opinion of the doctor made it impossible for the injured person to return to work on the calendar day following the day on which the injury occurred, or some later day)—caused the loss of three weeks from work on the average. This represented a considerable loss of production, the report points out, particularly if the injured worker was a skilled employee. The loss of time in the rubber industry averaged higher than for industry as a whole.

The proportion of permanent partial disabilities to all reportable injuries was 1 in 18; 1 in 342 cases was a death. Permanent partial disabilities averaged 565 days per case, exceeding the average for all industries. The report indicates that progress in reducing the frequency of serious injuries has not kept pace with the improvement in eliminating temporary total disabilities.

Plants manufacturing mechanical rubber goods had the worst 1942 records, averaging 13.27 for frequency and 1.0 for severity. This was attributed partially to large increases of 57% in frequency and 86% in severity from the previous year. This adverse experience is one of the reasons for generally higher rates in the industry. Three year rates of 10.07 for frequency and 0.83 for severity were higher than the rates of other branches of the industry for the same period.

While both 1942 injury rates of large and small plants increased, small plant rates rose most in comparison with 1941.

Reports giving the details about 68 fatalities and permanent partial disabilities showed that the most frequent unsafe conditions in the accidents were inadequate guarding and worn, broken, and poorly designed tools and other defective equipment. Disobedience of instructions, haste, and other improper attitudes were the most frequent personal causes.

According to the Safety Council's report, the Providence, R. I., plant of the U. S. Rubber Co. holds the best all-time record in the mechanical rubber goods classification and also the largest perfect record in the entire industry—5,688,369 man-hours. In rubber footwear, U. S. Rubber's Naugatuck, Conn., plant holds the best record—4,131,362 man-hours; in tire manufacturing, the Goodyear Tire & Rubber Company's plant at New Toronto, Ont., Canada, is the leader with 3,372,670 man-hours; and in rubber reclaiming, the U. S. Rubber Reclaiming Company's plant at Buffalo, N. Y., is tops with 2,722,536 man-hours.

Coming Events

Nov. 17. Ontario Rubber Section, Canadian Chemical Ass'n, Toronto, Canada.

Nov. 19. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Nov. 19. R. I. Rubber Club, Crown Hotel, Providence, R. I.

Dec. 6-11. 19th Exposition of Chemical Industries, Madison Square Garden, New York City.

Dec. 7. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Calif.

Dec. 15. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Dec. 15. Rubber & Plastics Div., Montreal Section, S. C. I., Ritz-Carlton Hotel, Montreal, Canada.

Dec. 16. Buffalo Rubber Group, Buffalo, N. Y.

Dec. 17. New York Rubber Group, Xmas Party, Building Trades Club, New York.

Dec. 17. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Jan. 10-14. S.A.E., Annual Meeting, Book-Cadillac Hotel, Detroit, Mich.

Mar. 28-30. Tenth Annual Chemurgic Conference, St. Louis, Mo.

WAR PRODUCTION UNDERTONE TO FEATURE CHEMICAL SHOW

The 19th Exposition of Chemical Industries will open at Madison Square Garden, New York City, on Monday, December 6, at 2:00 P.M. The exposition, which is being held at the Garden this year rather than at Grand Central Palace, due to the fact that the latter has been taken over by the U. S. Army, will be open daily from 11:00 A.M. to 10:00 P.M. and is scheduled to end at 6:00 P.M. on Saturday, December 11.

The 19th Exposition is well timed from the standpoint of industry's present situation. Many of the exhibitors, as well as many of their customer contacts, are figuratively buried in war work. The undertone therefore is the insistent note of achievement in war production and the unending search for faster and better methods, the adaptation of materials and the adoption of new methods and new materials as fast as they can be found.

Owing to the secrecy surrounding many branches of war production, this year's Exposition has been deprived of many exhibits which would otherwise be shown. These, however, pertain solely to the war effort and in many instances would be unsuited for commercial exploitation.

A review of the exhibits, as far as they have been disclosed in advance of the opening, reveals representation in nearly all categories of previous expositions. This means that the Exposition will cover much the same territory as in previous years but with change of emphasis appropriate to the momentary scene.

A general forecast, based on advance information, indicates that more than half of the displays will relate to machinery and manufacturing equipment, with technical equipment including research apparatus, instruments and controls second and processing materials third in order of precedence.

The Exposition of Chemical Industries is under the management of the International Exposition Company, of which Charles F. Roth is president. Mr. Roth is manager of the Exposition.

To Make New Type Leather Soles

"Trolene-ized Leather" will be used in the production of 30,000 pairs of shoe soles weekly by a pilot plant set up by the Russell Manufacturing Co., Middletown, Conn. The plant will begin operations on November 15. Trolene-ized leather is made by shredding bits and pieces of fine leather and recombining the shreds into sheets of various thicknesses with Trolene, a rubber-like chemical compound. Tests indicate that the material compares favorably with high quality sole leather and eventually it promises to be employed also in luggage, upholstery, sporting goods, and other products.

CHICAGO GROUP HEARS VILA AT FIRST MEETING OF SEASON

Approximately 160 members attended the first meeting of the season of the Chicago Group, Rubber Division, A.C.S., held at the Morrison Hotel in Chicago on Friday evening, October 15. The principal speaker was George R. Vila, of Naugatuck Chemical, who discussed "Some Practical Aspects in the Compounding and Processing of GR-S.."

Irving Pflaum, foreign editor of the *Chicago Daily Times,* in an address on the topic, "Will the War End in 1943?", stressed the importance of the Moscow Conference, stating that the conclusion of the war this year depended almost entirely upon the success of that conference.

An abstract of Mr. Vila's paper, prepared by the speaker, follows:

One of the basic differences between GR-S and natural rubber vulcanizates is the failure of the former to develop crystallinity upon stretching. The development of a crystalline structure at elongations of approximately 300% is believed to act as a self-generated internal reinforcing medium which is reflected in a sharp increase in stress upon the application of additional increments of strain. This phenomenon, of course, would readily explain why GR-S exhibits relatively poor gum tensiles.

Fortunately, the addition of carbon black makes it possible to produce GR-S vulcanizates which duplicate the stress strain characteristics of similarly loaded natural rubber vulcanizates at least up to tensiles of approximately 3,000 pounds per square inch. It is also possible to obtain improved tensiles from other pigments such as semi-reinforcing blacks, clay, and certain fine particle-sized siftings. Coarse whitings, on the other hand, do not afford this improvement. The increase in the tensile of GR-S compounded with each of these materials falls in an inverse order to drop in tensile realized when the same materials are compounded into natural rubber. It is obvious, therefore, that meticulous care must be taken in the mixing of GR-S to insure good dispersion and the development of the maximum properties possible at any pigment loading level.

Inasmuch as the tensile properties of GR-S improve with increasing pigment loadings, in a range where those of natural rubber would be declining it is frequently desirable to employ appreciably higher loadings with GR-S. Excessively high moduli values may be offset by a concomitant increase in softener ratios.

It is common knowledge, of course, that GR-S may be vulcanized with sulfur and organic accelerators similar to the ones used with natural rubber. There is an important difference, however, in the vulcanization process, in so far as GR-S does not revert but becomes progressively stiffer with overcuring. With natural rubber this tendency toward reversion is overcome by using persistent types of accelerators. With GR-S, however, non-persistent types tend to minimize this hardening-up effect. Thus MBT, a persistent type, tends to give poorer heat aging with GR-S than Monex, an accelerator of the fugitive type.

Recent work indicates that a combination of a thiuram and an aldehyde-amine provides a reverting type of acceleration in GR-S. This development is based on the observation that high amounts of a typical aldehyde-amine, such as Beutene, tends to exert a softening effect which is particularly evident after oven aging. Such combinations are believed to offer interesting possibilities for future development.

GR-S is manufactured to a specified Mooney viscosity range of 45 to 55 points. Different lots of polymer tend to show a variable rate of decrease in viscosity, however, with open mill breakdown. This rate may conveniently be expressed as a coefficient which appears to be a characteristic and reproducible function for any given lot of polymer and may form the basis of a scheme for blending operations.

The temperature at which GR-S is plasticated has been found to be critical. Progressively longer periods of breakdown on a hot mill tend to produce compounds which tube faster and smoother than is realized with cold breakdown. Such treatment, however, tends to exert a deleterious effect on the quality of the ensuing vulcanizate. A similar result may be obtained with increasing softener ratios or increasing pigment ratios. In general, a practical solution to the problem of efficiently processing GR-S would seem to lie in a combination of a limited degree of hot plastication, high pigment ratios, and high softener ratios.

A high degree of correlation has been observed between surface smoothness of the mixed compound and relative swell tubing, smoother stocks exhibiting progressively lower swell. Enhanced surface smoothness also tends to give faster tubing rates, other things being equal. No consistent relationship has been observed, however, between tubing speed and viscosity or plasticity measurements although the latter do indicate the power requirements. Increased worm speeds also result in faster tubing rates and higher power requirements, other things being equal.

THERMOID COMPANY, TRENTON, APPOINTS C. B. MOORE AND HARRY BOURNE

C. B. Moore

Harry Bourne

Clarence B. Moore has been appointed head of the Rubber Division of the Thermoid Research Laboratories of the Thermoid Co., Trenton, N. J., and Harry Bourne has been appointed methods engineer in charge of hose production for the rubber department. Joseph Harrison, Thermoid's chief rubber chemist, will continue in his post, as will the rest of the rubber research staff.

Mr. Moore, a member of the American Chemical Society and its affiliate, the Akron Rubber Group, formerly was with the Goodyear Tire & Rubber Co. for six years and with the B. F. Goodrich Co. for about 15 years. While with Goodrich he served as group head of the Technical Division for Industrial Rubber Products and later in technical sales and service with the Philadelphia Rubber Works.

Mr. Bourne has spent more than 25 years in the rubber industry, having been connected formerly with the Boston Woven Hose & Rubber Co., the Electric Hose & Rubber Co. as plant manager, and the B. F. Goodrich Co. as production manager of hose.

BOSTON RUBBER GROUP HEARS TALK ON NEOPRENE

Approximately 265 members and guests, one of the largest attendances enjoyed for some time, heard O. M. Hayden, Assistant Manager of the Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., discuss "Neoprene: Latest Developments in Compound Practice", at the Fall Meeting of the Boston Group, Rubber Division, A.C.S., held at the Parker House in Boston on October 22. The program also included a talk by Charles Winthrop Copp.

First disclosing that both the Deepwater, N. J., and the Louisville, Ky., plants were producing Neoprene GN, or GR-M, in excess of rated capacity, Mr. Hayden then reviewed the various types of neoprene now in commercial use, including GN, FR, and ILS, as well as Latex Types 571 and 60. After outlining the manufacture of these types briefly, the speaker launched into a discussion of their compounding and processing.

Included among the compounding practices stressed by Mr. Hayden were the following: organic accelerators, such as Pip-Pip and DPG, are the best chemical plasticizers; blending of 5 to 10% of Neoprene FR or GR-S with GR-M will be of assistance in calendering; the absence of antioxidant in GR-M usually requires that one be added to the compound; in view of the current shortage of light-calcined magnesium oxide the use of heavier grades is suggested; Permalux antioxidants in GR-M stocks containing litharge is recommended in cases where resilience and oil resistance is desired.

Mr. Hayden also discussed the use of neoprene for cements, stating that Neoprene CG should be used for cements where high initial bond strength was desired and Neoprene KNR for preparing high solid cements of putty-like consistency. He reviewed the rapid growth of neoprene latices during the past year for the cementing of leather, adding that good tack could be secured as a rule by the addition of approximately 2½ per cent of TMTS. In concluding his talk, Mr. Hayden urged his listeners to promptly return all metal containers, since the shortage of such containers may interfere with shipments in the future.

The second speaker, Mr. Copp, discussed the Japan of yesterday, today and tomorrow. Since the speaker had spent more than 20 years in Japan as a teacher of English in the schools of that country, and since he was held a prisoner by the Japs for several months after the outbreak of war in the Pacific, he delivered an interesting talk, which was well received by his audience. Mr. Copp urged that Japanese cities be bombed into oblivion so that never again could Japan launch another war.

At the brief business session, Lawrence R. Clarke (Haartz-Mason-Grower), chairman of the group, appointed Donald D. Wright (Hood Rubber), Harold Liddick (Davidson Rubber), and James Walton (Boston Woven Hose) as members of the Nominating Committee to present a slate of new officers at the next meeting. He also introduced a number of those seated at the speaker's table, including Alfred A. Glidden, of Hood Rubber, who is rounding out 50 years of service with that company; Thomas C. Edwards, formerly of Goodrich, who recently joined the Davidson Rubber Co. as chief chemist and factory superintendent; and A. J. Mease, recently transferred from Wilmington to the Boston office of DuPont.

Military Tires

Some facts on military tires were included in an address made by Harvey S. Firestone, Jr., president, Firestone Tire & Rubber Co., Akron, before the Economic Club of Detroit on November 8. Mr. Firestone pointed out that before Pearl Harbor the average weight of a tire was about 35 pounds whereas today it is about 55 pounds. The size of combat tires used by the Armed Forces in greatest numbers takes six times more rubber and five times more fabric than the most popular size of passenger car tire, and also requires more man-hours to produce. Because of these and other factors, he said, the tire industry's peacetime capacity of 90,000,000 tires a year has been cut to considerably less than half in 1943.

Two Types of GR-S

In a memorandum issued to consumers of synthetic rubber, the Office of the Rubber Director recently made it clear that there are two types of GR-S now available, these being GR-S-St and GR-S 85. GR-S-St is the regular, standard GR-S containing Stalite antioxidant, which is offered for use in the manufacture of light colored goods or where a copolymer with minimum staining or discoloring properties is needed. GR-S 85 is GR-S of a high viscosity, approximately 85 Mooney, which was developed primarily for use in the manufacture of compressed asbestos sheet packing where cements of controllable high viscosity are required. The latter type is tough to handle on a mill or in a Banbury and is therefore not recommended for ordinary dry mixes.

Xmas Party for Buffalo Group

The Buffalo Group, Rubber Division, A.C.S., will hold its annual Christmas Party in Buffalo on Thursday evening, December 16. The meeting will feature the distribution of lucky number prizes, but the full program will be announced shortly. Details can be secured from the group's secretary, Norman J. Cyphers, Hewitt Rubber Corp., Buffalo, N. Y.

PASSENGER TIRE SHORTAGE IS THEME OF RMA CAMPAIGN

Speaking for the major portion of the tire manufacturers and distributors in the United States, the Rubber Manufacturers Association has launched an advertising campaign to acquaint the public with the true situation in regard to passenger car tires. The campaign stresses the theme that although the rubber shortage is behind us the tire shortage is still definitely here.

In its opening full-page advertisement, which appeared in newspapers in leading cities throughout the country, the RMA first explained the reasons for the tire shortage despite the fact that synthetic rubber production facilities were rapidly reaching the planned point. Reasons outlined included these: inventories of prewar tires are gone; military needs are beyond anticipation; manpower ordinarily used for tires is now being used to make bullet-sealing gas tanks and other non-tire military products; and, finally, the manpower shortage which hangs over the tire industry as it does over all industry.

Not Yet an Improvement

Giving the facts about both passenger car and truck and bus tires, the advertisement stated that "the synthetic rubber tire is not yet an improvement but it will keep your car rolling through the emergency" and "in many respects the new synthetic rubber tires are an unknown quality." The point was stressed that the behavior of synthetic tires at the phenomenally high speeds of prewar days is purely academic, but at this stage of production they will stand less abuses, such as under-inflation and driving over rough roads, than the tires the average motorist has been used to.

Referring to bus and truck tires, the advertisement stressed the fact that synthetic truck and bus tires now built "will not stand all the abuse that the prewar tire would take, especially overloading." It warned truck operators to remember that while the treads of the present tires are vitally important, "the carcasses of these tires have a value to our truck operators, and to the nation, that is beyond price." It also urged that every one of these tires must be recapped the very minute it needs it "before any damage is done to the carcass."

Conservation steps recommended by Washington, including those which have since become official through the issuance of special orders and directives, are outlined in the R.M.A. advertisement. These include: do no unnecessary driving; do not exceed 35 miles per hour; keep tires inflated up to recommended pressure; avoid hitting holes in the road or bruising tires on curbs or stones; check wheels for alignment; switch tires from wheel to wheel every 5,000 miles; and, most important of all, have tires recapped just as soon as they become smooth.

ROLE OF SECONDARY CHEMICALS IN SYNTHETIC RUBBER PROGRAM

Aside from the chief constituents—butadiene, styrene, isobutylene, isoprene and chloroprene—many other chemicals are required in the overall synthetic rubber program, and although their proportions are small, the total amounts are large. In the processing of the synthetic rubbers, moreover, still other substances are needed; some of these are the same as those used in the processing of natural rubber, but in greater proportions; some are quite different. The total amounts of all these so-called "secondary" chemicals reach staggering figures and are the subject of an item in the November, 1943, issue of *U.S.I. Chemical News*, the monthly news report issued by U. S. Industrial Chemicals, Inc.

These additional chemicals, according to the report referred to, are both inorganic and organic. Large amounts of alum and soda ash, for example, are required to soften the water used in the polymerization process; sodium metaphosphate is used for preventing corrosion in pumps, pipe lines and tanks; chlorine is employed to keep down slime formation in apparatus; anhydrous ammonia and brine are necessary to furnish refrigeration; tons of rock salt and much sulfuric acid are used in solution to precipitate or coagulate the synthetic latex.

Organic stabilizers, little known compounds which prevent the premature polymerization of the butadiene and styrene while in storage, are present in only about two hundredths of one per cent. Yet on the basis of 748,600 tons of butadiene (called for in the government program), this small proportion means about 150 tons, or a third of a million pounds. Furthermore, these stabilizing agents must be removed before the material is emulsified, and for this a solution of sodium hydroxide is required.

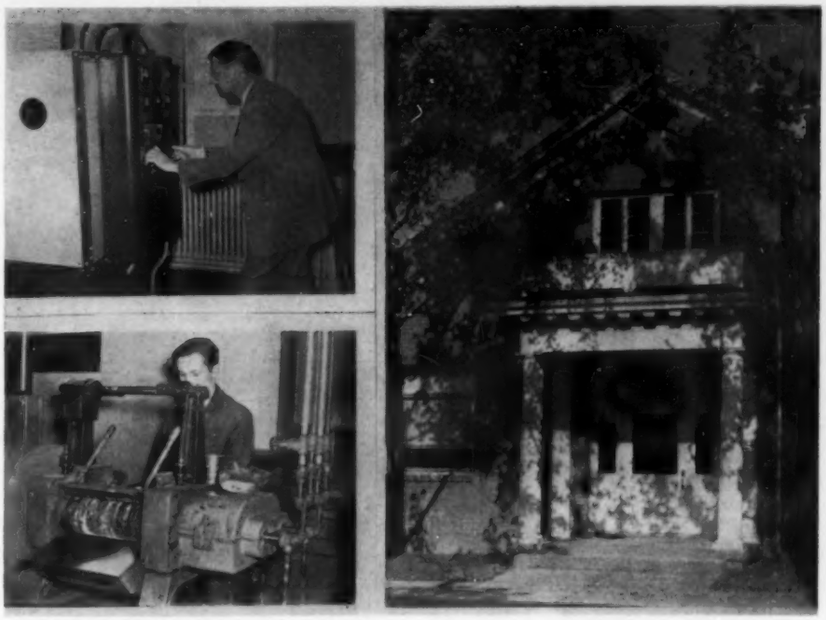
The emulsification of the butadiene and styrene requires great quantities of soap, pure sodium stearate. The plants are designed to use soap itself or to make the soap from stearic acid and sodium hydroxide. The polymerization catalyst is added to the emulsified materials, and later a reaction stopper or anti-polymerizing agent is used to arrest the polymerization at the proper stage. (This reaction stopper may be an antioxidant and therefore serve a dual purpose.)

Larger proportions of softeners are generally required in GR-S than in natural rubber. If at least five per cent of a softener is used in every GR-S compound, the total amount would be 36,750 tons or somewhat over 82,000,000 pounds! Softeners must be cheap and the important ones come from coal tar and turpentine products. High-boiling esters such, for example, as dibutyl phthalate, dibutyl sebacate, etc., are in favor in the processing of some of the synthetic rubber compounds.

Organic accelerators are important in the vulcanization of GR-S compounds, as with natural rubber. There are variations in the effects obtained, but mercaptobenzothiazole is the leader in both cases. Tetramethylthiurammono-sulfide and mercaptothiazoline are also useful. The aldehyde-amine type of accelerator, like the butyraldehyde condensation product with aniline, acts best as a secondary accelerator to "boost" the action of those just mentioned. From 1.0 to 1.5 parts are generally used to 100 of the synthetic rubber. On the basis of 735,000 tons of GR-S, one per cent means 7,350 tons of accelerators.

In the manufacture of Butyl rubber, boiling ethylene is used to refrigerate the reaction mixture. The manufacture of Buna N requires sodium oleate as the emulsifier, salt for the coagulation, and antioxidants for stopping the polymerization. Furthermore, reclaimed rubber is closely connected with the entire program and the amount now being made is almost double the pre-war production. Here caustic soda and oils from the coal and pine tar industries are widely used.

HODGMAN RUBBER CO. HOLDS "OPEN HOUSE" AT ITS NEW LABORATORY



The entrance to the new Hodgman Rubber Laboratory, and two of the new pieces of testing equipment.

Approximately seventy-five guests attended "open house" held by the Hodgman Rubber Co. at Framingham, Mass., to celebrate the completion of its new research laboratory. The guests included representatives from the rubber industry, the Army, Navy and Government, miscellaneous business organizations, and several dignitaries from the Town of Framingham. The celebration took place on October 21, and Joseph L. Haas, technical director of the company, played host, assisted by all the executives of the plant.

Starting at 3:00 P.M., the guests were shown through the new laboratory, which features the latest types of equipment, and were then taken on a tour of the factory itself. Later in the afternoon there was a cocktail party and dinner at the Framingham Country Club, which lasted well into the early hours of the following morning.

Hodgman Rubber is primarily engaged in the coating of cloth with rubber for a wide range of purposes, but its scope has increased considerably in recent years, particularly with the advent of the war. Today, the departments formerly devoted to coated cloth for the sporting goods and industrial clothing fields are now busily turning out a variety of war goods, including inflatable lifesaving equipment and protective clothing.

Spadone Concerns Move

The Spadone Machine Company and the Spadone-Hoag Corporation, formerly located at 122 East 25th Street, have removed their offices to 10 East 43rd St., New York 17, N. Y. The Spadone Machine Co. manufactures bias cutters, lining strippers, bale cutters, stock racks, press cleaners, and valve and bench trimmers, and also distributes hand and automatic shear type cutters, while the Spadone-Hoag Corp. acts as a distributor for bronze metaline oilless bearings among other products.

Suggests Compounding Substitutes

Due to the apparent temporary shortage of magnesium oxide x-light calcined for neoprene compounding, the Chemicals Division of WPB has suggested the following substitutes: Permanente RR, a product of Permanente Metals Corp., Permanente, Calif., which has approximately equal quantities of carbon and magnesium oxide; and No. 2665 Magnesium Oxide offered by Westvaco Chlorine Products Corp., New York City.

Permanente RR has been tested by DuPont's rubber laboratory and by the V. L. Smithers Laboratory in Akron, both laboratories reporting the resulting compound had as good characteristics, if not better, than that made with the regular x-light grade of magnesium oxide.

The Westvaco product has already been used for various types of rubber compounding by several rubber companies and the government agency suggests that, at least temporarily, any company which can use this material for even a portion of its compounding do so.

The following are producers of x-light calcined magnesium oxide: Baker Chemical, General Magnesite and Magnesia, Keasby & Mattison, Marine Magnesium Products, Michigan Chemical, and Standard Lime & Stone.

Akron Group Has Meeting

Approximately 145 members and guests attended the meeting of the Akron Group, Rubber Division, A.C.S., held at the Portage Hotel in Akron on November 5. Harry E. Blythe, vice-president of the Goodyear Aircraft Corp., the principal speaker, discussed "The Aircraft Story," in which he talked of the past, present and future of aircraft in general. F. D. Chittenden, now serving as chief chemist of the copolymer plant operated by U. S. Rubber Co. at Institute, West Va., was present at the meeting and was introduced to the members and guests by A. E. Sidnell (Sieberling Latex), chairman of the group.

New Vinyl Resin Sole Offered

A new vinyl resin shoe soling material, which is said to combine strong wear resistance with light weight, is being manufactured by B. F. Goodrich Co., Akron, and has been furnished to shoe manufacturers since last April. It is believed that the new material will enable the manufacturers to turn out shoes much lighter and more flexible than could previously be made. New methods of stitching and attaching the soles have been developed. Goodrich officials report that extensive tests have indicated that the soles can be depended upon to give several times the service of other soles.

It has been announced at Akron that the Blue Grass Ordnance Depot, Richmond, Ky., will be operated by Firestone.

Copolymer History

According to a review of the government synthetic rubber program by William P. Witherow, president of the Blaw-Knox Co., Pittsburgh, the launching of the gigantic program was started on June 2, 1942. On that day an engineering design committee, consisting of government engineers, representatives of the four leading rubber companies, and Blaw-Knox engineers, held its first meeting in Pittsburgh. The committee remained in continuous session until November, 1942, while more than 200 engineers and draftsmen, working under its direction, were busy converting ideas into concrete plans. The result: A standard design for all copolymer plants making GR-S.

Thermoid Stock Offered

Blyth & Co. and Estabrook & Co. headed an underwriting group which offered last month $2,500,000 of the Thermoid Company's 4¼% first mortgage bonds due on October 15, 1958, at 102½. Blyth & Co. and Van Alstyne, Noel & Co. offered 124,000 shares of the company's common stock, $1 par value, at $8.875 a share. Thermoid filed a registration statement with the Securities and Exchange Commission on October 8 covering the issuance. Part of the new financing is intended to be used in connection with the recent acquisition by Thermoid of 95.67% of the stock of the Jos. Stokes Rubber Co. Both concerns are located at Trenton, N. J.

Highest award in the National Victory Garden Institute competition has been awarded to the Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J., for "outstanding contribution to the Victory Garden Program in 1943." More than 400 gardens, which were worked by Manhattan's employees, were included in the project

Restrictions have been lifted on Vulcalock cement, product of Goodrich. The manufacturer announces that it is now possible for anyone who can qualify under Rubber Order R-1 to purchase and use the material, which has wide application in the art of bonding rubber to metals.

Reprints of an article entitled "Blends of Thiokol FA with Neoprene GN, Hycar OR-15, and Perbunan 26", by S. M. Martin, Jr., and A. E. Laurence, of the Thiokol Corp., which appeared in the September, 1943, issue of *Industrial and Engineering Chemistry*, have been made available by Thiokol and may be obtained on request to the company at Trenton, N. J.

Changes at Naugatuck Chemical

Harold I. Beadle, widely known chemical engineer, has been appointed sales manager for new products of the Naugatuck Chemical Division of the U. S. Rubber Co., according to an announcement by R. E. Casey, general sales manager of that division. In this capacity, Mr. Beadle will handle sales of new synthetic rubbers and plastics, as well as other new developments of a chemical nature.

In addition, Mr. Casey announced a number of changes in the personnel of the company, including the following: Arthur Nolan has been appointed sales manager for Lotol, Latex and Dispersions Process, Inc.; Raymond E. Nelson, formerly assistant sales manager for these products, has assumed the duties of sales specialist, concentrating his attention on new outlets; Paul Mahoney, formerly of the general development division has joined the sales force, specializing on temporary protective coatings; H. W. Maucher joined the sales department and will represent the department at the Naugatuck chemical plant; Howard G. Ling has joined the rubber chemicals sales force, with headquarters in New York; and Oliver E. Goddard has been appointed sales analyst, reporting to the general sales manager.

Mr. Nolan, who has been serving as a consultant to the ORD at Washington, has resigned that post.

New Plasticizer Introduced

An ether type plasticizer, designed to give outstanding cold temperature resistance to the various types of synthetic rubber, recently was introduced by the Thiokol Corp., Trenton, N. J. Known as TP-90-B, it has a specific gravity of 0.97, is straw-colored, and is said to be compatible in unlimited quantities with all types of synthetic rubbers except Thiokol FA, in which the solubility is approximately 10 parts on 100 parts of Thiokol FA. In tests conducted by the manufacturer, increased percentages of TP-90-B in Hycar OR-15 improved the resistance to cold to the point where the stock containing 50 parts stiffened at —70° F.

Additional "E" Awards

Army-Navy "E" flags for production efficiency have been awarded to Keasbey & Mattison Co., Ambler, Penna., and the Josephtown (Penna.) Zinc Smelter of the St. Joseph Lead Co. of Pennsylvania. White star awards for continued maintenance of high output standards have been received by Firestone Tire & Rubber Co. and Seiberling Rubber Co., Akron; Electric Storage Battery Co., Philadelphia; the Ansonia and Derby, Conn., and Buffalo, N. Y., plants of the Farrel-Birmingham Co.; the Niagara Falls plant of the Mathieson Alkali Works, Inc.; and the Hazard Insulated Wire Works, division of the Okonite Company, at Wilkes-Barre, Penna.

Fernley H. Banbury Retires

F. H. Banbury

Fernley H. Banbury has retired from active management of the Banbury Mixer Department of Farrel-Birmingham Co. and in the future will act in a consulting capacity, maintaining his headquarters as formerly at the company's main offices at Ansonia, Conn. Mr. Banbury requested the retirement.

Internationally known for his invention of the Banbury mixer, which has revolutionized mixing processes in rubber and plastics plants throughout the world, Mr. Banbury has been connected with Farrel-Birmingham for 27 years and has been manager of the mixer department for the past 15 years.

Born in England

Born in England, Mr. Banbury, after studying steam, mechanical, and mining engineering in that country, came to America and received a B. Sc. degree in electrical engineering from Purdue University. For several years he was associated with prominent utility and engineering interests in Chicago and later worked with Dr. Acheson, inventor of carborundum, in the technical and commercial development of new products.

In 1916 Mr. Banbury joined the staff of Birmingham Iron Foundry and for ten years was works manager of the plant, which later became part of Farrel-Birmingham Co. For more than a quarter of a century he has devoted most of his time and attention to ways of increasing the mechanical efficiency of the mixing machine bearing his name and to working out many new applications for it. Since the issue of the basic patent Mr. Banbury has been granted 24 additional United States patents covering improvements to the mixer.

In February, 1940, he was awarded the Modern Pioneer Scroll of Achievement, an honor conferred on outstanding inventors and research scientists in various fields of industry by the Modern Pioneer Awards Committee under the sponsorship of the National Association of Manufacturers. The award was made to Mr. Banbury for his notable service to industry by his invention of the Banbury mixer.

Take Over Lockwood's Service

The special service rendered to members of the rubber industry at Washington, D. C., by Warren Lockwood has been taken over by S. P. Dorsey and H. H. Rockwell. The business will be continued in the name of Dorsey & Rockwell and offices will still be maintained in the Shoreham Building at Washington. Mr. Lockwood, who established the service about a year ago, has rejoined the Department of State and will be stationed at the American Embassy in London where he will specialize in rubber problems. Mr. Lockwood handled the same assignment at the London Embassy from 1935 through 1938.

Messrs. Dorsey and Rockwell are well qualified to take over this service, which consists of representing or advising manufacturers in and on all problems connected with the government, the nature of the service varying in the light of the individual problem of any particular company. Mr. Dorsey was Manager of Priorities and Materials Control of the Office of the Rubber Director since the inception of that organization, while Mr. Rockwell was Controlled Materials Officer of the same Office. In addition, Mr. Dorsey served as the Rubber Director's representative on the Requirements Committee of WPB.

A graduate of Dartmouth College and he Graduate School of Business Administration of Harvard University, Mr. Dorsey was associated with the First Boston Corp., Boston, Mass., as a member of the industrial engineering staff of its buying department, before joining the Office of Production Management, predecessor to WPB, in March, 1941. Mr. Rockwell, a graduate of Yale University, joined OPM in November, 1941, and formerly was president of the Rockwell Building Co. and executive vice-president of L. C. Hyde and Brittan Bank, Beloit, Wisconsin.

Vibeston Production in Progress

Mass production of Vibeston, a new sound-deadening material which has been developed by the General Laboratories of the U. S. Rubber Co., is now in progress. Developed to alleviate conditions now threatening airplane crew members with deafness, the new material serves both to deaden sound and dampen vibration, and it reduces the fatigue of aluminum, U. S. Rubber officials state. Vibeston is said to be 50% lighter than mica, the only other known material comparable for this purpose in planes and the major supply of which was cut off by the war.

D. A. Comes Succeeds Banbury

D. A. Comes

D. A. Comes has succeeded Fernley H. Banbury, retired, as manager of the Banbury Mixer Department of the Farrel-Birmingham Co. Mr. Comes joined the Birmingham Iron Foundry, now a part of Farrel-Birmingham, in 1922 and has been associated with Mr. Banbury in his work for the past 21 years. For a number of years he has maintained offices at Hackensack, N. J., but now, as manager of the mixer department, he will make his headquarters at Ansonia, Conn. D. G. Warner, who joined the Birmingham Iron Foundry in 1912 and has been connected with the department since 1928, has been appointed assistant manager.

Leblang with Wishnick-Tumpeer

Mack Leblang, general manager of the Hazard Advertising Co. for the past several years, has joined Wishnick-Tumpeer, Inc., as assistant to Robert I. Wishnick, president of the company, in the execution of the company's long range program of product research and manufacturing. He will also be in charge of the company's product and institutional advertising. While serving with Hazard Advertising, Mr. Leblang was responsible for all Wishnick-Tumpeer advertising.

Hycar Prices Again Reduced

Hycar Chemical Co., Akron, has announced that, effective November 1, the price of Hycar OR-15 (specific gravity 1.00) has been reduced to 56c per pound for standard 100-pound cartons. This represents a reduction of 7c per pound from the 63c level established on March 1 of this year. The newly established price for Hycar OR-25 (specific gravity 0.98) and Hycar OS-10 (specific gravity 0.98) in similar quantities is 50c per pound.

NAMES IN THE NEWS

COL. BRADLEY DEWEY, president of the Dewey & Almy Chemical Co., Cambridge, Mass., now serving as Rubber Director of the United States, is one of 13 chemists proposed for nomination for President-Elect of the American Chemical Society.

FRANCIS J. CURTIS, director of development of the Monsanto Chemical Co., has been elected a vice-president of that company. In his new capacity, he will be in charge of a long range program of development, including general research and general sales development.

JOHN H. MCGILL, factory auditor of the B. F. Goodrich Co., Akron, for the past 10 years, has been named assistant controller of that company, succeeding H. V. GAERTNER, recently appointed assistant treasurer.

D. H. SPICER, president and general manager of the World Bestos Corp., Paterson, N. J., was recently elected president of the Brake Lining Manufacturers Association.

HARRY H. SLEVIN, a member of the automobile tire sales division of the Goodyear Tire & Rubber Co., Akron, has entered the U. S. Navy with the rank of Lieutenant.

ERWIN EBLE, associated with Akron and Cleveland newspapers for the past fifteen years, has joined the public relations department of the General Tire & Rubber Co. at Akron.

W. E. KLIPPERT, veteran plantation expert of the Goodyear Tire & Rubber Co., who was recently assigned to experimental work on the company's plantation in Costa Rica, has been appointed a director of the Rubber Bank of Brazil.

ALBERT E. MADSEN, who has represented the Holland-Rantos Co. in Northern California for the past few years, has been appointed sales manager of that company, with headquarters in New York City.

JAMES DRISCOLL, formerly affiliated with the Johns-Manville organization as research engineer, is now associated with the Bayonne, N. J., laboratories of the General Cable Corp. as research development engineer.

E. T. FOOTE, first vice-president in charge of sales of Globe-Union, Inc., Milwaukee, Wisc., was recently elected president of the Association of American Battery Manufacturers, Inc. V. L. SMITHERS, of Akron, is Commissioner of the Association.

ARTHUR J. GILLIGAN, chemist, has been appointed chief chemist of the South Braintree, Mass., plant of the Armstrong Cork Co., succeeding W. L. MACKINNON, recently resigned.

ARISTID V. GROSSE, associated with the Office of the Rubber Director for the past year or so, and who was one of the members of the four-man commission recently sent to the Soviet Union to study Russian methods of producing synthetic rubber, has resigned his official position to become director of research of the Houdry Laboratories, Catalytic Development Corp., Marcus Hook, Penna.

C. EDGAR MAYNARD, who recently resigned as factory manager of the Fisk Tire plant of U. S. Rubber Co. at Chicopee Falls, Mass., has joined the Prophy-lac-tic Brush Co., Florence, Mass., as vice-president and operations manager.

J. ARTHUR MINCH, vice-president of the Electric Auto-Lite Co. and general manager of that company's wire division at Port Huron, Mich., has been placed in charge of operations of the company's battery division, succeeding the late JOSEPH H. MCDUFFEE.

VICTOR P. SHAFFER, associated with the Calco Chemical Co. for the past ten years, has been named engineer in charge of design for the Process Division of the H. K. Porter Co., Inc., Pittsburgh, Penna. He will also direct an expanded program of development and research currently being launched by the company.

FRANK KAFER, associated with the Highway Transportation Department of Goodyear Tire & Rubber Co., will leave Akron soon for Calcutta, India, where he will become sales manager of the company's subsidiary in that country.

J. A. BATY, formerly in charge of the analyatical laboratories of the U. S. Rubber Co. at Passaic, N. J., and an active member of A.S.T.M. Committee D-11 on Rubber Products, is now associated with the C. P. Hall Co., Akron.

JOHN S. WEARE, sales manager of the Cambridge Rubber Co., Cambridge, Mass., has been appointed vice-president of the Cambridge Rubber Sales Corp.

DR. JOHN J. GREBE, director of the physical research laboratory of the Dow Chemical Co., Midland, Mich., was presented with the Chemical Industry Medal for 1943 by the Society of Chemical Industry on November 12.

ROBERT F. MCENTEE, who was associated with Hecht, Levis & Kahn, Inc., for many years as assistant treasurer and director, and who visited the Far East shortly before the war with Japan, has rejoined the company as secretary and a member of the board of directors. In recent months he has served with the Rubber Reserve Co.

PAUL J. WEBER, economist and research head of the Hercules Powder Co., Wilmington, Delaware, has been elected assistant treasurer of that company.

JOHN C. GRAE, New England sales manager of the Baldwin-Southwark Division of the Baldwin Locomotive Works, Philadelphia, Penna., since 1925, has been appointed sales manager of the Division's hydraulic press and special equipment department.

CHESTER F. CONNER, associated with the B. F. Goodrich Co. for more than 30 years, has been named assistant general manager of the Industrial Products Sales Division of the company. FRED LANG has been named merchandise manager of the same division.

Heads New Goodyear Division

Herman R. Thies, former assistant manager of the Goodyear Research Laboratory, has been appointed manager of the newly-organized Plastics & Chemical Sales Division of the Goodyear Tire & Rubber Co. at Akron. Mr. Thies has been with Goodyear since 1930, when he started in the company's research department. He formerly was associated with the Miller Rubber Co., is a graduate in chemistry of Philips University, and holds a master of science degree from the University of Chicago. He served two years in the Army during World War I.

R. I. Club to See Two Films

The Rhode Island Rubber Club will hold a dinner meeting on Friday, November 19, at the Crown Hotel, Providence. Through the courtesy of the Farrel-Birmingham Co., two sound films, "Robots and Rubber" and "Rubber at the Rouge," will be shown. The first named film presents a theoretical conception of the rubber factory of the future and the second is of particular interest now as it deals with the Ford plant that recently was dismantled and sent to Soviet Russia under lend-lease arrangements with the U. S. Government.

Employees of Pharis Tire & Rubber Co., Newark, Ohio, are busily engaged in repairing mechanical equipment and a building, used as a temporary laboratory, which was gutted by fire recently when static sparks caused an explosion.

UNIFORMITY
RELIABILITY

FURNEX POSSESSES THESE QUALITIES TO THE SAME DEGREE AS **MICRONEX.** IN OTHER WORDS, THERE IS NO BETTER BLACK IN THE **SR** RANGE.

FURNEX

THE HIGH RESILIENCE CARBON

A COLUMBIAN COLLOID

BINNEY & SMITH CO.
DISTRIBUTOR

•

COLUMBIAN CARBON CO.
MANUFACTURER

FURNEX

It is one thing to develop fine qualities in a product, and quite another thing to maintain those qualities unimpaired month after month and year after year to the end that certainty of their uniformity becomes the faith of their users. Both objectives have been accomplished in relation to Furnex.

So, when we tell you that Furnex exhibits the same uniformity and reliability that caused you to prefer Micronex among the channel blacks, we invite you to have the same faith in Furnex among the (SR-F) furnace blacks.

It is the purpose of its makers that Furnex always shall be the outstanding leader in uniformity and reliability in its field.

STATEX

The CURRENT CHOICE for all GR-S dynamic reinforcement. Statex compounds are cool running, flat curing and more resistant to cut growth.

MICRONEX

For 30 years the STANDARD CHANNEL CARBON...designed to impart the maximum reinforcement to rubber.

COLUMBIAN COLLOIDS

BINNEY & SMITH CO.
DISTRIBUTOR

•

COLUMBIAN CARBON CO.
MANUFACTURER

New Synthetic Rubber Developed

A new synthetic rubber, said to be the sixth major type to be discovered through chemical research, has been developed by the General Laboratories of U. S. Rubber Co. The new material, known as Uskol, resulted from search for a rubber which would provide greater resistance to attack of high octane aviation gasoline and, while its use will be limited to war products for the duration, its distinctive properties are expected to make it attractive ultimately in the manufacture of a wide variety of industrial and household products.

Offering a high degree of resistance to solvents and other penetrating chemicals which are the enemies not only of natural rubber but of the other five synthetic types, according to the manufacturer it also may make possible for the first time the manufacture of raincoats that can be dry cleaned.

From the manufacturing viewpoint, Uskol is said to possess numerous advantages: it can be vulcanized in several ways to acquire high physical properties; it has high tear resistance, exceeding that of natural rubber; it can be used alone or as a blend with other synthetics; it is highly resistant to the effects of sunlight, ozone, and oxygen; it has no odor either in the raw material state or in the finished product; it can be produced with present machinery and it is easy to handle during manufacture.

N. Y. Plans Xmas Party

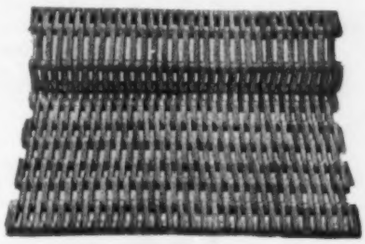
The New York Group, Rubber Division, A.C.S., will hold its annual Christmas Party this year as usual. It will be held on Friday evening, December 17, at the Building Trades Club in New York City. Due to food and other difficulties, however, attendance will be limited to only 325 members and guests. No technical session will be held, and the meeting will feature special entertainment in addition to the usual distribution of prizes to holders of lucky number tickets. The Nominating Committee, headed by John DeC. Van Etten, of Vansul & Co., will render its report. Tickets will be $3.00 for members and $5.00 for non-members and should be secured as early as possible from the secretary of the group, B. B. Wilson, *India Rubber World*, 386 Fourth Ave., New York City.

Van Cleef Heads Safety Section

Paul Van Cleef, of Van Cleef Bros., Chicago, has been elected general chairman of the Rubber Section of the National Safety Council for the 1943-44 term. Others chosen to serve with Mr. Van Cleef are John E. Lovas (U. S. Rubber Co., Passaic), vice-chairman in charge of program; Roland Kastell (U. S. Rubber Co., New York), secretary; and Glen D. Cross (Firestone), news letter editor.

Tuf-Link Safety Mats

Tuf-Link Safety Mats, manufactured of scrap rubber composition links held in place with heavy wire rods, are currently being offered by the Industrial



Products Co., 2803 No. 4th St., Philadelphia, Penna. The mats are said to be practical for use in front of metal, wood working and other machines where there is not an excessive amount of oil. For cleaning purposes, the mats are easily rolled up and the dirt swept from under them. Stock sizes range from 14 x 21 inches to 30 x 48 inches. Special sizes, however, can be produced to order.

Carman Heads Plastics Group

Frank H. Carman, who has been closely allied with the rubber program at Washington since leaving the Armstrong Cork Co. as a research chemist in 1941, has been appointed general manager of the Plastics Materials Manufacturers' Association, Washington, D. C. The appointment is effective January 1, 1944. Originally appointed to WPB to handle the allocation of neoprene, Mr. Carman was responsible for allocations of all synthetic rubbers and vinyl polymers until August, 1943. Prior to the appointment of William M. Jeffers as Rubber Director, he handled all details connected with the synthetic rubber program for WPB. Since August, 1942, Mr. Carman has acted as Chief of the Plastic Section of the WPB Chemicals Division. Before joining Armstrong Cork, he was associated for several years with the Goodrich organization.

Northern California Meets

A regular meeting of the North California Rubber Group was held at the Hotel Claremont in Berkeley, Calif., on October 28, with approximately 40 members and guests in attendance. Vic Vodra (Vanderbilt) rendered a comprehensive report on the technical papers which were presented during the three-day meeting of the Rubber Division, A.C.S., held in New York City early in October, particularly with regard to the papers which touched on the compounding of GR-S. Russell Kettering (Oliver Tire) and D. C. Maddy (Hycar Chemical) added their comments to those of Mr. Vodra.

After a general discussion of these comments, Arthur E. Barrett (Rubber Laboratory, Mare Island) read an abstract of the paper on "The Effects of Blending Some Natural Rubbers with GR-S," which he had delivered at the Division meeting. No door prizes or table favors were distributed at this meeting.

Earlier in the month, on October 11, a special meeting of the group was held so that C. A. Carlton (Huber) could deliver an informal talk on GR-S. A question-and-answer forum was held and much specific data resulted. At this meeting a $25.00 war bond, presented as a door prize by H. M. Royal, Inc., through George Steinbach, was won by George Graham (Reliance Rubber).

Goodyear Forms Subsidiary

Formation of a new subsidiary, to be known as the Goodyear Synthetic Rubber Corp. and wholly owned by the parent company, has been announced by the Goodyear Tire & Rubber Co. The subsidiary will take over the operation of plants with a total annual capacity of 150,000 tons of synthetic rubber in Akron, Los Angeles, and Houston. These plants are government-owned and were erected by Goodyear under agreements with the Defense Plant Corp. P. W. Litchfield, chairman of the Goodyear board, recently announced that the company's program of synthetic plant construction is now more than 85% completed, with units in Akron and Los Angeles already in production and the Houston plant due to begin operations within a short time.

Chicago Plans Christmas Party

The Chicago Group, Rubber Division, A.C.S., will hold its annual Christmas party on December 17 in the Terrace Casino of the Morrison Hotel, Chicago. The committee in charge consists of James Sheridan (New Jersey Zinc) and H. A. Winkelman (Dryden Rubber), co-chairmen, and Parker Highsmith (Bibb Manufacturing), Mel Vaughn (Wishnick-Tumpeer), and W. F. Bernstein (consulting engineer). There will be gifts for the ladies and entertainment will be provided.

NEWS IN BRIEF

The start of volume production at its Passaic, N. J., plant of industrial belting made with synthetic rubber has been announced by U. S. Rubber.

Goodrich will manufacture and market a new type of protective skin cream, known as Skim-Cote. The company announces that the cream is especially useful where industrial workers need protection for their hands yet cannot work efficiently while wearing gloves.

To instruct users of welding and cutting equipment in reducing potential fire losses, the International Acetylene Association has prepared a 16-page pocket-size booklet entitled "Preventing Welding and Cutting Fires." It contains brief, clear discussions of the chief causes of fires and practical measures for preventing them.

Goodyear officials announce that thin strips of synthetic rubber are enabling the speedy erection of portable fuel-storage tanks as quickly as they are needed by the Armed Forces. The strips, less than a quarter of an inch thick, provide barriers or seals between quickly-assembled and disassembled sheets of steel which form the exteriors of the fuel storage tanks.

A new process, called Hydro-flation and described as "the practical way to fill tractor tires with the maximum volume of liquid weight and still maintain an air cushion chamber necessary to provide pneumatic tire advantages and protect tires against body failure," has been introduced by Firestone. Tires inflated to a high level with liquid maintain a more constant inflation pressure. This is achieved by Hydro-flation, water entering a tire through a nozzle in the "Hydro-flator" and forcing air out through the "adapter." The adapters are small tubes made of Velon, a new Firestone plastic.

In an effort to assist in combating manpower shortages by promoting better physical working conditions, the Division of Labor Standards, Department of Labor, in consultation with the War and Navy Departments, the Maritime Commission, and WPB, has issued a pamphlet dealing primarily with safeguards to the physical efficiency of workers, many of whom are inexperienced in wartime. Technical problems of safety, health, sanitation, and hours are discussed. Copies of the booklet, "Special Bulletin No. 13," may be secured from the Division of Labor Standards, Washington.

Driving and service rules designed to help motorists get maximum wear from synthetic rubber tires are outlined in a consumer pamphlet being distributed by Goodrich. The pamphlet discusses air pressure, care of minor damage, driving speeds, and other factors that should be watched to guard the service life of the tires.

Glyco Products Co. is producing a series of new plasticizers and softeners for use in synthetic rubbers, adhesives, coatings, plastics, cellulose esters and ethers, and synthetic rubbers. They consist of alkyl and alkyl ether esters of higher fatty acids and dicarboxyllic acids and are characterized by their low freezing points and very mild odors. Copies of a chart listing these new products and giving their physical properties may be obtained from the company at 26 Court Street, Brooklyn, N. Y.

Methods of improving utilization of manpower resources and plant facilities through cooperation between management and labor are outlined in a booklet entitled "Production Management" just issued by the Bedaux Company, Chrysler Building, New York City. The booklet gives an explanation of the production management methods employed by the Bedaux industrial engineering organization, which, it is stated, are in use in approximately 1,000 industrial plants in the United States and Canada. The booklet points out that the widespread use of sound production management methods could add the equivalent of 4,000,000 new workers to war industries.

The Pension Trust Division of the Chase National Bank, New York City, has published a 92-page booklet containing comprehensive information about pension, bonus, and profit sharing systems. Among other things, it tells how a pension plan may be financed by investment in annuity contracts or in securities, and the differences between these methods.

Despite the fact that practically all of the Pliofilm being produced by Goodyear at present is reserved for military uses, such as the protective packaging of airplane engines, fuselages, parts and other Army and Navy equipment, the company discloses that this moisture-proof material is playing a vital role in many hospitals in the treatment of infantile paralysis. Pliofilm's use in poliomyelitis therapy was introduced by Sister Kenny several years ago at the University of Minnesota Hospital, which is constantly training doctors and nurses to employ the method elsewhere.

Hazapak rubberless wire, a new building wire designed to conserve critical materials and approved by Underwriter's Laboratories, Inc., is now available for use in building and power circuits. It is a product of Hazard Insulated Wire Works.

The M-1, just recently completed by the Goodyear Aircraft Corp., and reminiscent of the dirigibles "Akron" and "Macon", is being put through a series of test flights at Akron. The ship is larger than any non-rigid ship ever built in this country and is destined for extended patrol missions against enemy submarines. Beneath the streamlined envelope of the M-1 are three connecting cars, integrated by universal joints to allow freedom of motion in coordination with the flexible bag above.

Closed shop has been denied United Rubber Workers, Local 196, at the Faultless Rubber Co., Ashland, Ohio, but maintenance of union membership and check-off of union dues have been granted by the Regional War Labor Board.

The New Departure Division of General Motors has issued an illustrated booklet showing the various types of ball bearings used in aircraft, ships, tanks, trucks, etc. Copies may be had by requesting Booklet WW from New Departure's advertising department at Bristol, Conn.

The Toledo Rubber Products Co., which has been located in Middlefield for the past ten years, has moved to Waterville, Ohio. The Middlefield plant was damaged in a recent fire that swept the factory building of the Johnson Rubber Co., near which it was located. The company, which is manufacturing various types of matting on war contract and for civilian use, desired to be nearer the sales office of the American Mat Co., which handles its output.

"Make It Do Until Victory" is the title of an interesting wartime handbook for shopping, conservation, and household care that is being distributed by General Atlas Carbon as one of a series of consumer pamphlets.

The Johnson Rubber Company, Middlefield, Ohio, started work early in October on a new steel and concrete building that will provide 21,000 feet of floor space and will be used for presses and storage. The structure is being erected near the site of the portion of the Johnson plant that was burned in a recent fire.

Leasing of the Standard Tile Co. plant in Zanesville, Ohio, by Firestone Tire & Rubber for the production of bullet-sealing fuel tanks has been announced. Production will start immediately, according to Firestone officials, and approximately 1,000 persons will be employed.

APPLICATIONS OF AGRIPOL DISCUSSED AT CONFERENCE

The past, present and possible future applications of Agripol, the chemurgic rubber developed by Reichhold Chemicals, Inc., Detroit, Mich., was the subject of a paper on "Rubber from Soybeans," delivered by Andrew J. Snyder, Reichhold chemist, before the 4th Mid-American Chemurgic Conference, held at Cincinnati, Ohio, on September 29. First stating that the uses of Agripol had been considerably curtailed by the issuance of Rubber Order R-1 by WPB, which permitted increased use of reclaimed and synthetic rubber, Mr. Snyder then outlined some of the new uses developed for Agripol, including the following:

Ordnance wrapping paper is now being made by laminating or cementing one or more sheets of a suitable paper with an emulsion form of Agripol. The emulsion is spread upon one sheet, then another sheet is pressed on, and the water from the emulsion is removed either by a blast of warm air, infra-red lamps or hot rolls. Ordnance wrapping paper made in this manner has a surprisingly high degree of grease resistance and several paper companies are using the Agripol emulsion for its manufacture. When treated with the special emulsion, such paper will not crack or break at low temperatures.

The polyester used as a raw material for making Agripol compounds has also been found useful for laminating papers. The polyester for this purpose is incorporated with suitable resins and/or waxes in order to obtain the best results. Coatings of this kind may be applied either as a hot melt or from a solution of a suitable organic solvent.

Pressure Sensitive Adhesive

Agripol itself makes an excellent pressure sensitive adhesive. An interesting result with the polyester has been achieved along similar lines by one company in the preparation of a heat sensitive adhesive paper. Although under normal conditions the polyester is a very tacky material, tack-free sheets have been achieved. The unique feature of the paper referred to is in the application of the adhesive, which is printed upon the paper. This method of application tends to a more uniform coating, as well as to the use of a lesser amount of adhesive.

In the course of his address, Mr. Snyder pointed out that due to its inherent characteristics Agripol, when used for cushioning effect, stands up better than rubber on vibration, which makes it especially valuable for the bonding of a variety of fibers, including hair and glass, which are used for either their cushioning or insulating properties. He also stressed the fact that the dielectric strength and corona resistance of Agripol is equal to or superior to rubber, in addition to which ozone actually improves its qualities.

Life-Saving Balloons

Navy planes which have been shot down over water may be salvaged to fly and fight again under a plan developed by Navy engineers. At the General Tire & Rubber Company plant at Akron, Ohio, girls are making balloons which will do the job, the Navy believes. These balloons, each of which will lift 6,000 pounds, are attached to the sunken planes while uninflated. Air is then forced into the balloons and they lift the plane to the surface. Each balloon could lift five times as many girls as are shown in the above photo.

Montreal Plans Joint Meeting

The Rubber and Plastics Division, Montreal Section, Society of Chemical Industry, will hold a joint meeting with the parent section at the Ritz-Carlton Hotel, Montreal, Canada, on Wednesday, December 15. Dr. H. Mark, of the Polytechnic Institute of Brooklyn, N. Y., will speak on "Some Theoretical Aspects of the Synthetic Rubber Program." A regular meeting of the Rubber and Plastics Division was scheduled to be held on November 12 at McGill University. W. B. Wiegand, director of research of the Columbian Carbon Co., was to have spoken on "New Developments in Colloidal Carbons," stressing the role of the carbons in GR-S compounding. W. A. Ladd, research assistant to Dr. Wiegand, was to have discussed the electron microscope.

Resinex Extender-Plasticizer

Resinex, a resinous thermoplastic extender-plasticizer, has been developed and introduced by the Standard Chemical Co., Akron 8, Ohio. The new material, said to be adaptable to broad uses, has a melting point of 180° F. and a specific gravity of 1.20. It is compatible with all synthetic, reclaimed and natural rubbers. Laboratory test data is available from the manufacturer.

RUBBER AND PLASTICS GROUP TO HEAR TECHNICAL PAPERS

The Rubber and Plastics Group of the American Society of Mechanical Engineers will hold three technical sessions during the annual meeting of the parent society, scheduled to be held at the Hotel Pennsylvania, New York City, next month. The group will meet on Wednesday and Thursday, December 1 and 2. A total of nine papers will be presented.

The first of the three sessions will be held jointly with the Aviation Division at 2:00 P.M. on Wednesday, December 1. Papers scheduled for this meeting are: *Current Applications and Future Possibilities of Paper-Base Laminates in Aircraft,* by Charles F. Marschner (McDonnell Aircraft Corp., St. Louis); *Plastic Tubings and Fittings,* by William M. White (Douglas Aircraft Co., Santa Monica, Calif.); and *Behavior of Synthetic Urea-Resin Assembly Adhesives Under Alternating Stresses,* by Albert H. Dietz (Massachusetts Institute of Technology) and Henry Grinsfelder (Resinous Products & Chemical Co., Philadelphia).

The plastics session will be opened at 9:30 on Thursday morning, December 2, and the following papers will be heard: *Creep Properties of Molded Phenolic Resins,* by David Telfair, T. S. Carswell, and H. K. Nason (Monsanto Chemical Co., Springfield, Mass.); *Plastic Printing Plates,* by William R. McLain (Huntsville, Ala.); and *Antiscatter Treatments for Glass,* by Frank W. Reinhart, Ruth Kronstadt, and Gordon M. Kline (National Bureau of Standards).

The rubber session will follow on Thursday afternoon at 2 o'clock and the three papers to be offered are: *Inflatable Life-Saving Rafts in the War Effort,* by J. G. Kreyer (Firestone Tire & Rubber Co., Akron); *Use of Rubber in Power Drive Lines,* by James N. Booth (Thompson Products Co., Detroit); and *Advances in Rubber and Plastics During 1943,* by W. J. Liska (Firestone, Akron) and G. M. Kline (National Bureau of Standards). Mr. Liska will discuss rubber and Mr. Kline plastics.

All engineers interested in these subjects are invited to attend the sessions.

Chicago to Hear Crossley

Robert H. Crossley, of the Xylos Rubber Co., will be the principal speaker at the next meeting of the Chicago Group, Rubber Division, A. C. S., to be held at the Morrison Hotel on Friday evening, November 19. Mr. Crossley's subject will be "Compounding and Processing of Butaprene." Ensign Harold B. Boaz, U.S.N., who has been with the Navy ten years and just recently returned to the United States after three years overseas service in the Philippines, Corregidor, Netherlands East Indies, and the Australian areas, will be the second speaker.

LOS ANGELES NEWS

Curtis R. Wolter, treasurer of the Los Angeles Rubber Group, is now traffic manager for the U. S. Rubber Synthetic Division at Torrance, Los Angeles suburb. He previously was connected with the purchasing department in the main Los Angeles plant. The offices of the Synthetic Division recently moved into the new administration building at Torrance.

Word has been received in Los Angeles that A. D. Nast, Jr., president of Western Insulated Wire, Inc., has been appointed director of facilities for the American Red Cross in England. Mr. Nast went overseas some months ago.

Ken Fleshman, who is connected with the Institute (West Virginia) plant of the U. S. Rubber Company, was in Los Angeles for a week at the time of the opening of the synthetic plant at Torrance.

Vic Vodra, Pacific coast representative of the R. T. Vanderbilt Co., is back in Los Angeles after a trip which took him to the laboratory in Connecticut, the meeting of the American Chemical Society in New York, and to Seattle, San Francisco and other West Coast points. At Oakland Mr. Vodra addressed a meeting of the Northern California Rubber Group.

Claus H. Vonder Reith, of the Sierra Rubber Company, has returned to Los Angeles after being absent for a month in New York and other points east. In New York he attended the meeting of the American Chemical Society.

Carl Eugene Huxley has joined Western Insulated Wire, Inc., as a chemical engineer. Mr. Huxley is a recent graduate of the University of Southern California.

The Caram Manufacturing Company, 1223 E. 63rd Street, has practically completed the installation of a new lacquer manufacturing division in its plant. The lacquer, intended primarily for shoes, will be made in all colors. The department will occupy approximately 2,500 square feet of floor space. Yates Van Patter has joined the force as a chemist and will devote most of his time to this division of the plant. Mr. Van Patter was formerly connected with Leon Finch, Ltd., lacquer manufacturers.

P. W. Litchfield, chairman of the Goodyear board of directors, gave an address to the Foreman's Club in Los Angeles at the October meeting, describing a 25,000 mile trip by air, water, and rail that he recently completed.

Bob Abbott, local representative of the C. P. Hall Company, who spent some time in a hospital a while back, is now in perfect health again.

J. B. Preston and wife, who have been in California for a short time, spending time both in Los Angeles and in San Francisco, left on October 29 for their home in Darien, Conn. Mr. Preston is connected with the English Mica Company, a company with mines located in North Carolina.

J. H. Devar, vice-president, and J. S. Smith, industrial sales manager, of the Wagner Electric Corporation, spent a week in the Los Angeles area in November, arriving November 15.

A. F. Hambly, who was associated with Emmet Long in the firm of Long and Hambly, Ltd., London, England, for ten years, has arrived in Los Angeles from Florida where he has spent the last three years. The rubber manufacturing firm in London was sold just before the beginning of the war. Mr. Hambly is not a stranger in Los Angeles as he spent many years here before going to England.

T. Kirk Hill returned safely from his annual prairie chicken and pheasant hunt in the vicinity of Kenmare, North Dakota. He had good luck in bagging birds but reports that he had bad luck in transportation, 105 pheasants spoiling en route to Los Angeles.

Goodyear Changes Subsidiary Name

The name of the Southwest Cotton Co., subsidiary of the Goodyear Tire & Rubber Co., which directs the operation of 35,000 acres of land in the Salt River Valley of Arizona, has been changed to Goodyear Farms. The new name reflects the development of the project originally conceived as a source of supply for long staple cotton, most of which came from the Nile River Valley of Egypt until shipping was disrupted by submarine warfare in World War I.

NWLB has granted wage increases to the 1,400 employees of the St. Marys (Ohio) Manufacturing Co., a subsidiary of Goodyear. Base rate for all piece workers has been increased 7 cents per hour, hourly workers 9 cents, and engineering workers 10 cents. Hiring and minimum rates were raised 10 cents. The increases are retroactive to August 13, 1942.

ROUND-TABLE DISCUSSION FEATURES L. A. MEETING

Approximately 105 members and guests attended the regular monthly supper meeting of the Los Angeles Group, Rubber Division, A.C.S., held at the Mayfair Hotel in Los Angeles on November 2. The feature of the meeting was a round-table discussion on the processing of GR-S and other synthetic rubbers.

The round-table discussion was headed by Phil Drew (Goodyear) as "moderator," and was participated in by the following: S. R. Corbett (Office of the Rubber Director), Griffith Oliver (Oliver Tire), R. D. Kettering (Oliver Tire), Charles Lamb, Sr. (West American Rubber), Cliff A. Neville (U. S. Rubber), Vic Vodra (Vanderbilt), L. C. Weimer (Voit Rubber), and R. E. Hutchinson (Firestone). Questions flew thick and fast but it was generally agreed that the members of the round-table were able to supply specific answers in most cases. The round-table idea received commendation and will probably be repeated at future meetings.

Motion Pictures Shown

In addition to the technical discussion, two motion pictures were shown, one depicting one day of war in Russia, and the other showing various stages of development of aircraft and aviation in connection with the United States Navy.

The meeting featured a lengthy business session, during which various committees rendered their reports. Curtis R. Wolter (U. S. Rubber), treasurer of the group, reported that the funds were in good shape. Al Pickard (Braun Corp.), as head of the Christmas Party Committee, reported that the Pasadena Community Playhouse had been taken over by the group for one night and the group was responsible for filling the theatre that night. Based on the number of reservations taken at the meeting, there was little doubt that the theatre would be well filled. The Nominating Committee submitted its report, placing Mr. Pickard, who has served this year as Program Chairman, in nomination for chairman for 1944.

Amendments Submitted

A number of amendments to the group's by-laws were submitted and all were unanimously carried. Chief among these was the increase in membership dues from $1.00 to $5.00. Establishment of permanent "headquarters" in the Mayfair Hotel was also approved.

Door prizes, consisting of war bonds contributed by Naugatuck Chemical, through J. R. Morath, and a globe, donated by Stanco Distributors, Inc., through Jack Britton, were won by M. J. Bain (Butcher Co.), Bob Abbott (C. P. Hall Co.), and Walter Boswell (Thiokol). A special prize went to Maurice Chisholm (Kirkhill Rubber).

FINANCIAL NEWS

GENERAL TIRE REPORTS PROFIT OF $1,329,398 IN NINE MONTHS

General Tire & Rubber Company reports for the nine months to August 31 that net profit, after taxes and $300,000 reserve for contingencies, was $1,329,398, equal to $2.34 a common share. A renegotiation settlement covering the fiscal year ended November 30, 1942, provides for refund of $910,306.

The net effect of the refund on earnings after taxes is $141,731 decrease in profits before contingencies. Provision for contingencies originally reported by the company as $300,000 has been reduced by $195,534 so that a credit of $53,803 results. The company also restored a provision for bad debts, amounting to $500,000, which was eliminated in 1941.

As a result of these two adjustments, the net effect on previously reported earnings amounts to a reduction of $446,197. The adjusted net profit for the fiscal year ended November 30, 1942, is therefore $936,766, or $1.52 a common share.

American Cyanamid Co.

First Nine Months: Net income of $5,048,475 after providing $750,000 for contingencies and $14,910,358 for Federal and foreign taxes on income. After allowing for dividend requirements on the preference stock, the earnings are equivalent to $1.73 a share on the 2,639,026 shares of common stock outstanding. In the corresponding period of 1942 the company cleared $3,733,629, or $1.27 a share on the 2,618,364 shares of common stock, after deducting $750,000 for contingencies and $10,154,394 for taxes.

New Jersey Zinc Co.

First Nine Months: Net profit of $5,184,609, equal to $2.64 a share. In the comparable period a year ago the company earned $5,480,789, or $2.79 a share. Third Quarter: Net profit amounted to $1,735,332, or 88c a share, which compared with $1,712,785, or 87c a share, in the second quarter of 1943 and $1,986,471, or $1.01 a share, for the third quarter of 1942 .

Rome Cable Corp.

Six Months Ended September 30: Net profit of $301,043, or $1.58 a share, compared with $117,518, or 61c a share, for the corresponding period of 1942. Third Quarter: Net profit amounted to $175,129, or 92c a share, against a June quarter net of $125,914, or 66c a share, and $51,620, or 27c a share in the September quarter of 1942.

Thermoid Company

First Nine Months: Net profit of $535,623, equal to 98c a common share, subject to renegotiation and after $799,800 taxes and $191,000 reserve for specialty year-end comparison. This compares with a revised net profit of $452,024, or 80c a common share, after $424,200 taxes and $125,000 set aside for year-end compensation, in the corresponding period of 1942. Third Quarter: Net profit of $82,610, or 12c a common share, after $363,500 taxes, compared with a revised net profit of $70,273, or 10c a common share, after $162,400 taxes for the similar quarter of 1942. These figures do not include the earnings of the Stokes Rubber Co., acquired by Thermoid in recent months.

Electric Hose & Rubber Co.

Year Ended August 31: Net profit of $121,979, after provision for accrued Federal income and excess profits taxes, which compares with $164,227 reported for the previous fiscal year. According to the company's balance sheet, current assets as of August 31, 1943, amounted to $1,201,163, including $57,052 in cash, $379,110 in accounts receivable, and $763,594 in inventory, as against current liabilities of $721,295, including $158,351 in accounts payable, $200,000 in bank loans, and $214,985 in accrued taxes.

Belden Manufacturing Co.

First Nine Months: Net income after $885,000 Federal taxes and $45,170 provision for contingencies was $353,273, equal to $1.46 each on 241,547 shares, against $348,134, or $1.44 a common share last year, after $929,246 taxes and $44,449 contingency reserve. Net sales amounted to $8,345,948, compared with $7,237,506.

Boston Woven Hose & Rubber Co.

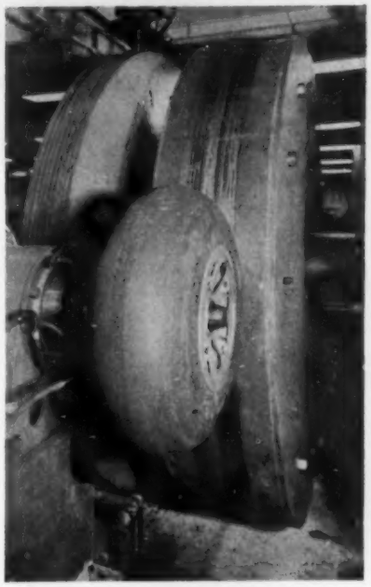
Year Ended August 31: Net income of $365,878, after provision of $368,300 for taxes, equal to $3.73 a share, which compares with $595,798 reported for the previous fiscal year.

Monsanto Chemical Co.

First Nine Months: Net income after $8,211,296 estimated taxes amounted to $4,145,705, or $2.77 a common share, against adjusted net earnings of $2.76 a common share last year.

Stockholders of the Lee Rubber & Tire Corp. have approved a pension plan for officers and employees.

New Testing Machine Developed



A new machine for testing airplane tires, wheels, and brakes which utilizes a wheel 10 feet in diameter and develops a top speed equivalent to 200 miles per hour has been developed and placed in operation by the Goodyear Tire & Rubber Co. A "landing" apparatus plunges a tire against the revolving wheel, which simulates an airplane's landing speed.

With an energy equivalent of 50,500,000 foot pounds, the machine can test loads up to 40,000 pounds per tire—the equivalent of an 80,000 pound airplane, which is considerably in excess of present weights. By means of 21 plates distributed on both sides of the center wheel, the "dead weight" can be increased or decreased as desired.

The Goodyear testing machine is powered by a 150 h.p. motor and needs only 17½ minutes to reach top speed. Requiring 168 revolutions for the equivalent of a mile's travel after an airplane tire "lands" against it, the main testing wheel weighs approximately 17,000 pounds. With the addition of the side plates, this weight can be increased to a total maximum of about 75,000 pounds.

Requiring two years to build, Goodyear officials estimate the weight of the installation at more than 150,000 pounds. In addition to the 40,000-pound landing apparatus on one side of the flywheel and an arrangement for testing brakes on the flywheel's axle, the machine is equipped with additional tire-testing apparatus on the other side of the wheel from the "landing" device. Power is applied to the flywheel from the motor by Goodyear's recently-developed steel cable V-belts.

FOR QUICKER VICTORY BUY BONDS AND STAMPS

OBITUARIES

David A. Cutler

David Adelbert Cutler, president and treasurer of the Alfred Hale Rubber Co., North Quincy, Mass., and a special assistant to the Rubber Director, died November 9 in his home at Wollaston, Mass., at the age of 64.

Mr. Cutler was born on November 6, 1879, in Wakefield, Mass., attended Burdett Business College, and was a graduate of Wesleyan University, where he majored in chemistry. He was chief chemist of the Manhattan Rubber Manufacturing Co., Passaic, N. J., from 1902 to 1906; manufacturing chemist of the Continental Rubber Co., New York City, 1906 to 1909; manager of the development department of the U. S. Rubber Co., New York City, 1910 to 1913; president of Acushnet Process Co., New Bedford, Mass., 1914 to 1916; and became president and treasurer of the Alfred Hale Company in 1916.

Mr. Cutler was president of the Rubber Section, now the Division of Rubber Chemistry, A. C. S., from 1910 to 1911. He was also active in the civic life of Quincy, at one time having served as president of the Quincy Chamber of Commerce, and was a Shriner.

He is survived by his widow, two daughters, and three sons, A. Cushing, vice-president and sales manager, and David R., vice-president and factory manager of the Alfred Hale Company, and William R. Cutler, now of the Army Air Force.

John T. Stubbs

John T. Stubbs, former credit manager of the Mohawk Rubber Co., died on October 14 in Lakeside Hospital, Cleveland, Ohio. He was 42 years of age. Mr. Stubbs lived in Akron and was employed by Mohawk for 15 years before moving to Cleveland and becoming associated with the Seybold-Potter-Harris Co. He was a 32nd degree Mason.

Robert Knoblock

Robert Knoblock, associated with the Pequanoc Rubber Co., Butler, N. J., for the past seventeen years as its mid-western representative, died on October 30 in South Bend, Indiana, from pneumonia, after a short illness of four days. He was 62 years of age and was widely known in rubber reclaiming circles.

Born in South Bend on March 29, 1881, Mr. Knoblock had lived in that city for sixty years, moving to Anderson, Indiana, only two years ago. Before joining Pequanoc Rubber in 1926, he had been connected for 21 years with the former Rubber Regenerating Co., now the reclaiming division of the Naugatuck Chemical Division of U. S. Rubber. He served first as superintendent and later as factory manager.

Mr. Knoblock was a member of various rubber organizations, including the Chicago Rubber Group. Funeral services were held in South Bend on November 2 with interment in Highland Cemetery. A widow survives.

William T. Cole

William T. Cole, for 30 years president and general manager of the Fabric Fire Hose Co., division of U. S. Rubber Co., in Sandy Hook, Conn., died October 9 at his home in Newtown, Conn. He was 81 years of age.

Mr. Cole started work with the Fabric Fire Hose Co. as a salesman in 1892 and five years later was made sales manager. In 1903 he became general manager. Eight years later he was appointed president and continued as general manager, positions he held for the next 30 years.

When he was nearly 80 years old, Mr. Cole retired from active service but continued on the company's rolls on a consulting basis. His son, Charles S. Cole, was appointed president and factory manager in 1941 to succeed his father. Besides the son, Mr. Cole is survived by his widow. Burial was in Newtown, Conn., on October 11.

J. M. S. Carroll

J. M. S. Carroll, manager of the mechanical sales department of the Dominion Rubber Co., Montreal, Canada, died recently. Prior to entering the rubber industry, Mr. Carroll was for some years connected with important mining enterprises in Australia and at one time was connected with the construction department of the Canadian Pacific Railway, at Winnipeg. Shortly after he joined Dominion Rubber, Mr. Carroll became secretary to the general manager and for many years served the interests of the company in sales work. He was president of the Dominion Commercial Travelers' Association in 1921 and was a member of the Canadian Circumnavigators' Club, having traveled around the world three times.

Dr. Charles P. Teeple

Dr. Charles P. Teeple, vice-president and director of research of the Crane Packing Company, Chicago, recently met with accidental death. Dr. Teeple pioneered numerous improvements in the mechanical packing industry and was considered one of its foremost chemical engineers and inventors, having made notable contributions to its development. He held a doctor's degree from the University of Michigan and was a member of the Society of Automotive Engineers and of the Illuminating Engineers Society.

Charles B. Seabury

Charles B. Seabury, who retired in 1930 as vice-president of the Boonton Rubber Co., now the Tech-Art Plastic Co., died November 7 in St. Petersburg, Fla., after an illness of several months. He was 86 years old and had been a resident of Boonton, N. J., since 1901.

Born in Gardiner, Maine, Mr. Seabury was descended from John Alden and from Samuel Seabury, first bishop of the Episcopal Church in America. After his graduation from Bowdoin College in 1877 he was principal of the Gardiner High School for six years. Later he lived in Brooklyn, N. Y., and Hackensack, N. J., and during this period was associated with Henry Holy & Co. and the Victor Talking Machine Co.

Mr. Seabury is survived by his widow and a son.

Furniture Ideas Exhibit Planned

Designers, decorators, illustrators, and manufacturing interests in such related fields as rubber, glass, aluminum, steel, plastics, and fabrics are invited to participate with their furniture ideas for post-war homes in a competitive showing at Grand Rapids, Mich., next January which is being arranged by Grand Rapids Industries, Inc. The motivating objective of the sponsors is to give visualization to some of the ideas that now are germinating in the minds of those who are thinking in terms of the era that is to come. Full details may be secured by writing to Howard R. Sluyter, chairman of the Furniture Planning Committee of Grand Rapids Industries, Monument Square Building, Grand Rapids, Mich.

Introduces Bunatak Plasticizers

Malrex Chemical Co., Malden, Mass., has introduced Bunatak plasticizers and tackifiers for processing all types of GR-S compounds. Pointing out that the mixing and calendering of GR-S has proven difficult as compared to rubber, the manufacturer states that Bunatak plasticizers and tackifiers have good dispersing qualities, softness, varying degrees of building tack, abrasion resistance, and produce rubber-like snappy cured stocks of high physical properties. It is said that the Bunataks have performed satisfactorily under practical plant production and that they are being used in quantity in the compounding of GR-S for footwear and molded goods.

CANADIAN NEWS

With increased demands both for military and civilian requirements, there is little likelihood that synthetic tires will be available to the average motorist for a long time to come, according to E. J. Thomas, president of the Goodyear Tire & Rubber Co., who was a visitor to Toronto on November 10. Whether or not synthetic rubber would replace raw rubber in the post-war era was a question mark, he said.

"The synthetic tire program is going along fine," Mr. Thomas stated, "and our company's schedule will be running at full speed by the first of the year. However, demands for 1944 are heavier than ever before, especially the military demands. So far, synthetic tires cannot stand excessive heat, especially when used on heavy trucks and fast passenger cars. I'd certainly advise the public to care for their tires as much as possible. There should be no relaxation in that regard."

In an address before 500 Goodyear employees at the seventh annual service-pin dinner for employees with 25 years of service, Mr. Thomas revealed that the company has 104,000 employees in all parts of the world. Twenty-three plants are operating in the United States and 12 in other countries, he said, pointing out that Goodyear had expended $75,000,000 in new buildings in the past two years and had appropriated $33,000,000 for 1944. He forecast a tremendous market for passenger and truck tires after the war.

Guests of honor were 52 employees of the Canadian company with 25 years of service to their credit. Workers with 30 to 35 years' service also were present. A. G. Partridge, president of Goodyear of Canada, spoke briefly and other speakers included R. C. Berkinshaw, general manager and treasurer; E. H. Koken, vice-president; and W. C. Kerr. Chairman of the evening was H. O. Allman.

There likely will be more raw material available by the end of 1943 than the rubber industry can process, according to J. E. Partenheimer, general manager of the Atlas Supply Co., Newark, N. J., who addressed the Toronto Electric Club on October 21.

"The dealers are back in the business," he said. "In 1943 they will do more passenger tire business than they did in 1938, and 1944 promises to set a record for passenger tire sales, new and retreaded, in the United States." The rubber industry's rate of processing in December, 1943, will be higher than ever before and will continue at record peaks during 1944, he predicted.

"Synthetic rubber tires will give adequate service. The difficulty has been in controlling the quality of synthetics from batch to batch and factory to factory. Tests of quality applied to crude rubber were found useless when applied to synthetics, and new tests had to be developed," said Mr. Partenheimer.

He promised increased quality in crude rubber and added: "I don't think anyone will care after the war whether we ever again have natural rubber or not, except for a few specific uses."

Raw rubber could be sold at New York at 10c a pound and show a profit to the plantations, he stated, and synthetic rubbers at 15c a pound, provided the end product gave 10% better wear, could compete with raw rubber at 10c a pound, since the cost of the rubber does not constitute the total cost of an end product such as a tire.

The recent Canadian Government order permitting retreading of tires for drivers in all categories was viewed as a "straw in the wind", indicating the probable easing of restrictions on the automobile, by C. R. Gall, general sales manager of Hudson Motors of Canada, Ltd., when he addressed the Central Ontario representatives of the Hudson sales and service organization gathered at Toronto recently.

Mr. Gall said he had recently met with dealers representing all makes of cars across Canada and that the old attitude of "dog-eat-dog" seems to have disappeared. "Perhaps this is due in a measure to the common sacrifices of all," he stated, "and to the greater strength of the dealer associations. When men meet around the same table, scramble their problems and try to solve them — not from a selfish standpoint, but for the good of the whole dealer body—a definite step forward has been made."

Mr. Gall pointed out that it is now realized by all that maintaining transportation is an essential war effort and that those who are part of the organization for distribution of parts and services are therefore indispensable.

Restrictions on the sale of protective rubber garments have been revoked by the Wartime Prices and Trade Board, it was announced October 25. Reclaim rubber now can be used for these garments in place of crude rubber, according to Rubber Administrator A. H. Williamson, and the supply of reclaim rubber is more adequate than formerly. "Protective rubber garments" means any of the following garments of which rubber is the component material: standard long coats, standard three-quarter length coats, firemen's coats, mining suits, fishing suits, sou'westers, mining hats, and acid resisting aprons.

The Dominion Rubber Co., Ltd., recently announced an increased amount of subscriptions to the Fifth Victory Loan. There was a standing offer from the management to plus an amount equal to that raised by the employees and, with this incentive, the workers raised $510,000. The company sent its check to the Victory Loan Committee for $1,110,000, consisting of the concern's regular subscription of $600,000, plus $510,000, equivalent to the amount subscribed by the employees. The combined subscriptions of the company and its employees aggregated $1,620,000, compared with $881,650 subscribed in the previous loan.

New Immersion Media Offered

Stanco Distributors, Inc., 26 Broadway, New York City, is offering for general distribution two high and low swell fluids for testing synthetic rubber products. Fuels which have been used for this purpose have varied appreciably in their effects on the properties of synthetic rubbers, Stanco points out, and these variations have caused confusion in the rubber and aircraft industries. Known as Reference Fluid SR-6 and Reference Fluid SR-10, the new immersion media are said to be made from materials of definite chemical composition. According to the distributors, SR-6 has been prepared to meet industry's need for a standard immersion medium which will provide an accurate and constant measure of the swelling effect of highly aromatic aviation gasoline on synthetic rubbers and SR-10 consists essentially of the non-aromatic constituents of SR-6 and has been prepared to meet the need for an immersion fluid providing an accurate and constant measure of the "low swelling" or shrinking effect of 65 octane gasoline on synthetic rubbers.

Ontario Group Hears Wiegand

W. B. Wiegand, director of research of the Columbian Carbon Co., will address the first meeting of the season of the Ontario Rubber Section, Canadian Chemical Association, which will be held in Toronto on November 17. Mr. Wiegand's subject will be "New Developments in Colloidal Carbons and the Role of Carbon Surface, pH, and Structure in GR-S Compounding."

Marshall Heads Pharis Tire

Furber Marshall, who has served as president of both the Marshall Asbestos Corp. and the Bendix Service Corp., subsidiaries of the Bendix Corporation, for the past seventeen years, has been elected president of the Pharis Tire & Rubber Co., of Newark, Ohio. He succeeds Carl Pharis, founder and president of the company, who has been made chairman of the board.

Johnson's Wax Finishes for Rubber Goods

• Like so many products, Johnson's Wax Finishes for Rubber Goods have gone to war. They are available now for materials and products made specifically for war use only.

If you are a manufacturer of rubber products for war use, Johnson's Wax Finishes may very well be helpful to you. They prolong the life of rubber goods because they retard oxidation, the destroyer of rubber. Johnson's Wax Finishes for Rubber Goods are easy to apply by dipping, spraying or wiping. Coverage is good. Sizes available: 5 and 55 gallon drums.

Some day . . . and we hope it isn't too far away . . . we shall again be able to supply wax finishes to manufacturers for peacetime use on rubber goods such as automobile door gaskets, rubber hose, tubing, rubber-covered wire, refrigerator gaskets, tires, stair tread, and the like. These wax finishes not only protect by retarding oxidation, but they also add greatly to appearance value.

But for the duration, Johnson's Wax Finishes for Rubber Goods must serve Uncle Sam first.

★ BUY U. S. WAR BONDS AND STAMPS ★

S. C. JOHNSON & SON, INC.

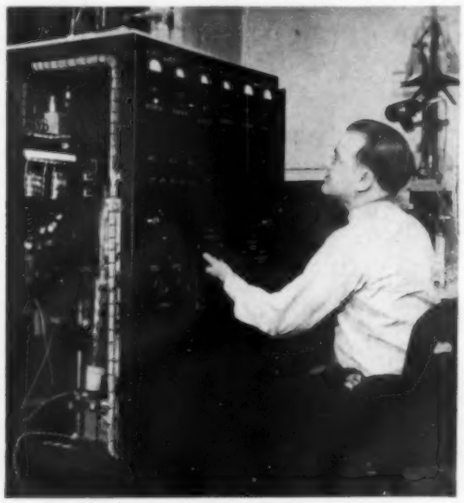
Industrial Wax Division, Dept. RA-113

Racine, Wisconsin

NEW EQUIPMENT

Westinghouse Mass Spectrometer

An electronic device, called the "mass spectrometer," has been introduced by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penna. Developed by Dr. John A. Hipple, physicist at the Westinghouse Research Laboratories, the new electronic device



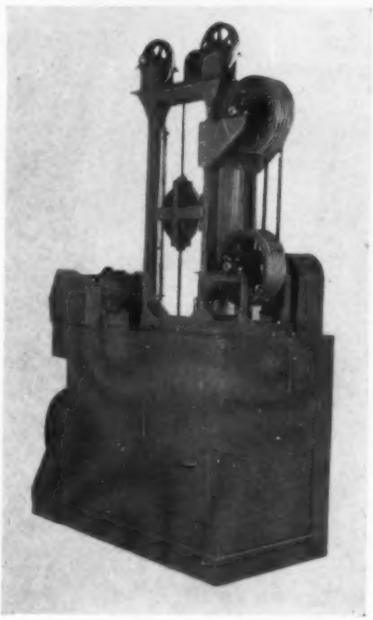
swiftly and precisely analyzes many of the complicated gases formed in making butadiene, the principal ingredient of several types of synthetic rubber. In 15 minutes this spectrometer will dissect a complicated gas molecule a twenty-five-millionth of an inch long and can be arranged to automatically produce an autograph that tells the chemist the composition of the gas. At present, certain analyses require from 15 hours to three days of painstaking laboratory work by five to ten skilled chemists. Others cannot be done at all even by other processes. Results attained by these tedious methods are much less accurate than the molecular "portrait" that comes out of the spectrometer.

The spectrometer is housed in a cube-shaped cabinet five feet high. Its key part is a yard-long glass vacuum tube shaped into a quarter-circle. This tube, lined with metal, is fixed between the poles of an electromagnet. Molecules of the gas being analyzed are given an electrical charge at one end of the tube and are shot toward the other end at a speed of approximately a million feet a second by high voltage electricity. The electromagnet pulls at these speeding molecules so that only those having a certain mass, or weight, travel down the center of the tube, around the bend and through a tiny slit in a metal target at the other end.

The molecules going through the target are collected on a metal plate where they give up their charges. Then the charges are amplified and counted by electric meters that indicate how many molecules of a certain weight are in the mixture. Molecules weighing less than those hitting the target are pulled to the metal lining of the tube before they can get around the bend. Heavier ones offer more resistance to the electromagnet's pull and strike the other wall of the tube as they try to negotiate the bend.

New Wind-Up Machine

A new wind-up machine for wire, cable, cords, rope, paper, tapes of various kinds, textiles and coated fabrics, has been developed by the Industrial Oven Engineering Company, 11621 Detroit Avenue, Cleveland, Ohio. Originally built in connection with this firm's cable lacquering equipment, and designed to meet strict Army-Navy specifications for uniform and concentric finishes in impregnation and coating of wire and cable



insulation, the wind-up stand is said to be the only one of its kind on the market, and is now available in two standard sizes.

It is a complete, self-contained unit with combination variable speed and hydraulic synchronizing equipment, designed to provide constant speed and constant tension within a variable production range. By arrangement of adjustable counter-weights, wire tension can be varied from a few ounces to hundreds of pounds. It comprises a dismountable reel stand, multi-wrap large-diameter capstans, constant but variable tension mechanism and an adjustable level winder, and is also equipped with provisions for driving assisting capstans which are required on some grades of fine wire being processed through multi-coat finishes. It is motor driven and requires no outside source of power or synchronization.

The machine is available in higher operating speeds for extrusion wind-up in the use of rubber or synthetic insulation materials, and continuous wind-up machines of the same basic design with high-speed crossover are available.

Similarly efficient unwind stands are also supplied in standard sizes for semi-automatic operation. The operator simply rolls the reel into position and steps on a foot pedal to raise the reel and set a counter-weighted tension brake simultaneously.

CHART RUBBER'S FUTURE
from this
STARTLING PREVIEW

To be among the first to see a startling new chart of industry—visit the 19th Exposition of Chemical Industries at New York's Madison Square Garden, December 6-11.

As a summary of current achievements in chemistry and engineering and a preview of the future, this Exposition deserves the attention of every chemist, engineer, production man, and executive in the natural and synthetic rubber industries. From what you can see . . . from what you can hear when you talk with the technical experts in attendance at exhibits . . . may come the answers to many otherwise baffling problems. It's the right place to seek the "know-how" you need to carry on in these days of allocations, limitations, Government restrictions and other necessary wartime handicaps.

Marvels in the production of new substances by chemical methods with their counterpart in special processing equipment are still necessarily in part a war secret. Many details that may be revealed, however, including not a few bearing on post-war plans, will form a leading interest at this year's Exposition of Chemical Industries.

Important decisions regarding the post-war activities of manufacturers may be made as a result of this Exposition. Much of the information to be disclosed reflects either the creation of new industries and their products, or the conversion of existing plants to new uses—to help win the war now, to help rebuild the world after Victory has been won.

To be among the first to see the startling new chart of industry, visit this year's Chemical Exposition—and bring your associates.

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Coal-tar softener, formerly widely used in natural rubber, now found to be an effective plasticizer and wetting agent for GR-S to improve resistance to abrasion, tensile strength, elongation and resilience.

COUMARONE RESINS

A number of Rubber Reserve Company's releases on compounding synthetic rubbers contain suggested recipes calling for coumarone resins. They are available in various melting points and colors.

DIBUTYL PHTHALATE

Effective softener for several of the synthetic rubbers, such as Hycar OR, Perbunan, etc., imparting high tensile, low modulus and low set.

RECLAIMING OILS

Several types manufactured for both digestor and pan processes.

COAL-TAR SOLVENTS

Benzol, Tollac* Solvent, Nevsol*, Xylol, 2-90-W* Hi Flash Solvent, Cosol*, and special solvents; for rubber cements and various rubber solutions.

*Reg. U. S. Pat. Off.

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MOONEY PLASTOMETER by Scott

We now manufacture the Mooney Plastometer for standard tests on GR-S, in addition to 60 other *Scott Testers for tensile, hysteresis, compression-cutting, adhesion, flexing, etc.

SCOTT TESTERS

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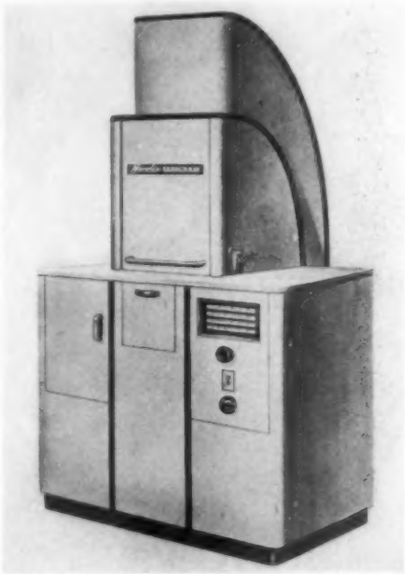
HENRY L. SCOTT CO. — 85 Blackstone St. Providence, R. I.

New Searchray X-Ray Model

A new model in its series of safe, self-contained, easily-operated x-ray units for industry has been announced by the Industrial Electronics Division of North American Philips Co., Inc., 100 East 42nd St., New York City. Known as Searchray Model 150, the



new unit is designed for inspection of parts, assemblies and finished products of hard rubber, plastic, dielectric materials, etc. It is said to make possible the taking of highest quality sharp radiographs quickly by plant personnel under controlled conditions without the expense of a skilled x-ray technician or the cost of a lead-lined room.

Searchray has a continuous kilovolt regulator which permits adjustment during viewing operation at any point from 0 to 150 Kv, so that depending on density and thickness of the part under observation, greater clarity on the fluoroscopic screen can be obtained. The apparatus can also be set for correct metal thickness on a direct reading scale when radiographs are to be taken. The continuous voltage regulator has four 11" linear scales, one each for KvP, aluminum, brass and steel.

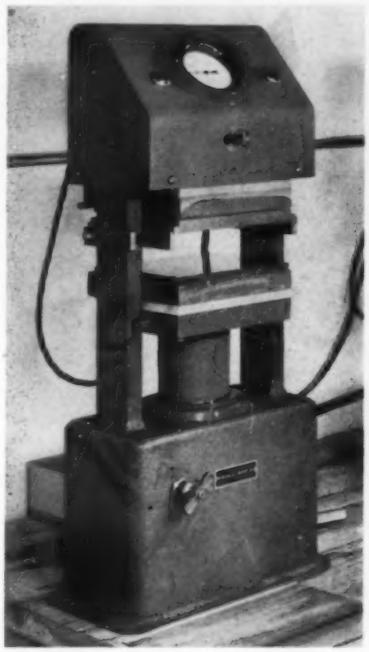
A cassette tunnel at the bottom of the radiographic compartment makes possible insertion and removal of x-ray film or paper without disturbing the position of the object. Under this cassette tunnel a fluoroscope screen is mounted. The image of the object can be viewed in a mirror through a folding eyepiece. The operator looks into this while seated in front of Searchray. This facilitates the positioning of an article before taking a radiograph.

The continuous KvP regulator is so located that it can be easily manipulated while looking into the eyepiece during fluoroscopic examination. A fluoroscopic shutter underneath the x-ray tube enables the operator to limit the field of vision, thus reducing the glare produced by direct radiation on the screen.

Long tube life on continuous or intermittent operation is assured by an electrical circuit so arranged that high tension can only be applied at a relatively low value.

Preco Laminating and Laboratory Press

Many manufacturers whose processes involve compression molding of synthetic rubber and small rubber parts are said to have found the Preco Laminating and Laboratory Press adaptable to a wide variety of



uses. An indication of the versatility of the press is the fact that it can be used to turn out plastic-laminated identification cards and badges. One operator can turn out well over 500 cards a day. Standing only 27½ inches high and weighing only 200 pounds, the Preco Press has a 750-watt heating element cast into each 8" x 8" platen. Platens are self-levelling, making adjustments unnecessary. The press is equipped with dual thermostatic controls for accurate temperature adjustment and precise heat control. A specially designed and patented 2-stage hydraulic pump provides rapid closure of the platens to the point of contact, then automatically shifts to low speed until desired pressure is reached. Another noteworthy feature of the press is its high pressure range—up to 40,000 pounds, comparable to much larger and more expensive presses. The Preco Press is distributed by the Kingsbacher-Murphy Co., Zone 21, Los Angeles.

The Aero-Seal line of **hose clamps** manufactured by the Aircraft Standards Parts Co., Rockford, Ill., now covers, in 16 models, all sizes of standard aircraft hose from ¼-inch inside diameter up to 4 inches. Latest additions to the line are Models M-6 and M-10 for hose sizes from ¼ to ¾ inches.

Accuracy to plus or minus 1% of full scale deflection, up to 5,000 r.p.m., is said to be one of the outstanding features of a new **Electric Tachometer** developed by the Ideal Commutator Dresser Co., Sycamore, Ill. The tachometer can be used as a "hand type" or "separable type."

FOR THOSE GR-S AND GR-M STOCKS

Successfully used since the introduction of these elastomers to American Rubber Manufacturers and with factors long since evaluated. Meeting today's needs as production swings to the Synthetics.

Types, grades and blends for special purposes, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural or Reclaimed.

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★ Here's how you—yes, YOU—can carry out a smashing "pincer movement" against the Axis. Swing in on one flank with increased production of war goods! Drive in on the other with redoubled purchases of War Bonds through your Pay-Roll Savings Plan!

You're an officer in both of these drives. Your personal leadership is equally vital to both. But have you followed the progress of your Pay-Roll Savings Plan as closely as you have your production?

Do you know about the new Treasury Department quotas for the current Pay-Roll Allotment Drive? *Quotas running about 50% above the former figures?* You see, these new quotas are based on the fact that the armed forces need more money than ever to win the war, while the average worker has more money than ever before to spend. Particularly so, on a *family income* basis—since in so many families several members are working, now.

Remember, the bond charts of today are the sales curves of tomorrow! Not only will these War Bonds implement our victory—they'll guard against inflation, and they'll furnish billions of dollars of purchasing power to help American business re-establish itself in the markets of peace.

So get this new family income plan working at once. Your local War Finance Committee will give you all the details of the new plan. Act today!

This advertisement prepared under the auspices of the War Advertising Council and the U. S. Treasury Department.

LET'S KEEP ON Backing the Attack!

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THE RUBBER AGE

REVIEWS

The Weeping Wood. By Vicki Baum. Published by Doubleday, Doran & Co., Inc., Garden City, N. Y. 5¾ x 8½ in. 531 pp. $3.00.

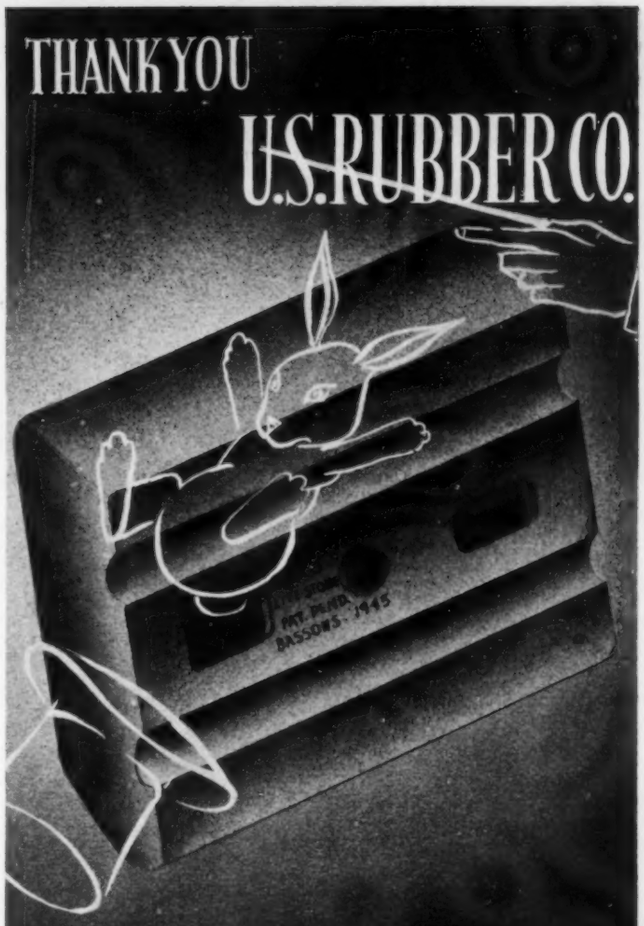
The whole long, tragic and sometimes romantic story of rubber is told in this new book by the celebrated author of *Grand Hotel*. It is told in the guise of a novel, which is actually three or four novels in one, since Miss Baum tells it in terms of people—what people did to rubber and, more particularly, what rubber did to people. The history of rubber from the time its first commercial possibilities were recognized through the controversies which marked the launching of the emergency synthetic rubber program in the United States is covered.

Following the technique which has marked her previous works, the author depicts the story of rubber as witnessed by fictional creatures. We become acquainted with the atrocities which marked the beginning of rubber collection activities in South America through the eyes of Ambrosio, a Branco from Ceara; witness the cultivation of seedlings in London's Kew Gardens through Daniel Chalmers, young botanist who originally prized his orchids more than the rubber seeds; follow the seedlings to Ceylon with young Daniel and watch his moral standards fall apart as his rubber trees grow in stature; learn of the development of bud grafting in Sumatra as told by Piet Gruytgens; trace the growth of large tire companies in the United States through the career of George Tyler, so-called rubber baron; sit in on the start of the labor movement in Akron, as told by an ex-soldier; learn of the attempted sabotage of the German synthetic rubber program by an anti-Nazi; listen to a Senate investigation of patent arrangements between Usa Oil and I. G. Farbenindustrie; and, finally, share the promise that rubber will be returned to the Western Hemisphere and will be made to "sing on wheels."

With the whole world for her background, rather than the confines of a small hotel, Miss Baum has told a vivid, panoramic story. From the standpoint of a novel, it makes interesting reading, particularly for those who can take grimness in wholesale doses, since the story of rubber, especially in its early days, is filled with evil and greed. But the book is intended to be more than just another novel. According to its preface, it "contains as much fact as it contains play and make-believe; it endeavors to give not only entertainment but also a certain amount of information; thus, it is an emulsion, a hybrid, a mongrel." Unfortunately, some of the so-termed facts are decidedly inaccurate.

If nothing else, Miss Baum is positive in her assertions. In telling of the transportation of rubber seeds from Brazil to Kew Gardens, she stamps Sir Henry Wickard as a smuggler. True, this is the popular conception, but it has often been argued that the seeds were taken with the full knowledge and consent of the Brazilian Government. Only a few years back, was this latter version given a semi-official backing by Brazilian authorities based on the discovery of some documentary evidence. Again, telling the story of Charles Goodyear through one of his numerous creditors, she intimates that Goodyear was not the real discoverer of vulcanization, "he just put one over on Nathaniel Hayward." Still again, in her chapter covering the Senate investigation, a counterpart of that launched into the actual Standard Oil-Farbenindustrie cross-licensing agreement, she leaves no doubt that the oil company was entirely at fault and bordered the line of treason in its dealings with the German chemical trust where synthetic rubber was concerned.

When the author gets into the story of synthetic rubber, then errors pop up one after the other. For instance, her description of metallic natrium is a chemical joke; Buna S formulas included are incorrect; the statement is made that



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Through our combined efforts the U. S. Rubber Company now has on its production line a new and revolutionary fuel cell form that is—

Light in weight.

Accurate in dimensional tolerances.

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Smooth surface of form for perfect tank interior.

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Easy breakout with minimum physical effort in exceptionally short time.

Form can be used for both dry or steam curing.

Due to material and method of manufacturing "Basco" forms, no dry room is necessary.

All these features give a low cost destructible form.

U. S. Rubber Co. has found in our form a product which saves in manufacturing costs and helps produce the best in fuel cells.

We invite inquiries on our *BASCO LITE-STONE FUEL CELL forms.

Arrangements can be made for your local vendor to manufacture to Basco specifications.

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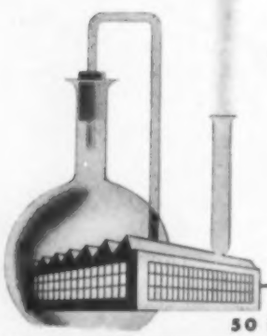
Tested Neoprene Compounds

TO replace rubber in the manufacture of life-rafts and other inflatable objects. Many formulas for rubber to rubber, rubber to metal, etc. immediately available — *tested formulas* developed out of successful, first-hand experience with neoprene compounds.



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Hand Grip Rubber Gauge No. 3-B

Height .....9"	Length .....9¾"	Range .....½"
Depth of Throat ....6½"	Dial 50 Divisions Each Div. 1/1000"	Weight .... 4 lbs. Frame . Aluminum

Designed for gauging stock as it is coming from the calender.

FRANK E. RANDALL, Waltham, Mass.

butadiene and styrene can be made from almost any hydrocarbon; Chemigum and Ameripol are called Buna S types of synthetic rubber; neoprene is termed unsatisfactory for tires. These are only some of the inaccuracies; there are plenty of others.

All in all, however, Vicki Baum's saga of rubber is well told, with rubber made both hero and villain. Because of its background it should prove especially interesting to members of the rubber industry, hundreds of whom are now helping to write the history which may someday become the background for a novel of the future.

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Elastic and Creep Properties of Filamentous Materials and Other High Polymers. By Herbert Leaderman. Published by the Textile Foundation, National Bureau of Standards, Washington, D. C. 7 x 10¼ in. 278 pp. $2.00.

In an effort to understand better the nature of the mechanical and electrical properties of high polymers, and how they are related to the chemical constitution of the material, much work has been done in the past decade on the physics of high polymers. This current work is concerned with a study of a phenomenon—delayed elasticity—which is observed in most high polymers.

The second part of the book gives an account of experiments that have been carried out by the author at M.I.T., under the auspices of the Textile Foundation, on the creep and creep recovery behavior of rayon, nylon and silk filaments. The experimental results are interpreted in terms of the structure of these materials, and conclusions are drawn concerning the mechanism of elastic and plastic deformation of textile filaments. The first part of the book deals with similar work that has been carried out with other high polymers, including rubber of course, and contains a critical discussion of relevant theories and of previous experimental work on delayed elastic behavior in other materials, such as glass.

This book, in presenting some of the current concepts concerning the structure and mechanical behavior of filamentous materials, should be of special value to the textile industry. For the same reason, however, it should also be in the hands of all those who are concerned with the manufacture and processing of plastics and rubber-like materials. The book has an extensive bibliography and a cross-referenced subject index. It is photo-offset.

•

The Chemical Front. By Williams Haynes. Published by Alfred A. Knopf, 501 Madison Ave., New York 22, N. Y. 5½ x 8½ in. 264 pp. (plus index). $3.00.

Writing in his usual clear, concise style, Mr. Haynes, one-time publisher of *Chemical Industries,* has furnished an interesting and dramatic story of the chemical munitions of modern warfare, of the men who discovered them, how they were made and used, and what they promise. Explosives, smoke screens, poison gas, sulfa drugs, serums and vaccines, blood plasma, atabrine, synthetic rubber, light metals, plastics, high octane gasoline—all these pass in review, with comments from an individual who has watched many of them from laboratory to commercial state.

The story of synthetic rubber is told in a chapter entitled, "Chemistry in Politics." First relating the history of synthetic rubber from the identification of isoprene by Williams in 1860, the author then discusses the current government production program. He outlines the confusion which surrounded the start of this gigantic endeavor and then tells of the trials and tribulations of William Jean in trying to have Washington recognize the importance of "Jeanite" rubber. In concluding this chapter, he predicts that synthetic rubber is here to stay and is ready to challenge natural rubber for one of the world's greatest commodity markets.

The book has 18 chapters in all and a subject index. It is liberally illustrated, including 8 plates in full color.

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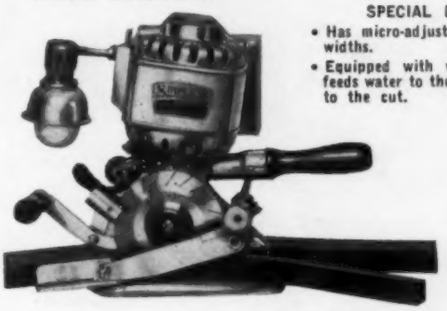

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REVIEWS (CONT'D)

Cellulose and Cellulose Derivatives. Edited by Emil Ott. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y. 6 x 9 in. 1176 pp. $15.00

(Available from Book Department, RUBBER AGE)

A monograph, prepared by a staff of specialists under the editorship of Dr. Ott, director of research of the Hercules Powder Co., this book is Volume V in the series of monographs on the chemistry, physics and technology of high polymeric substances published by Interscience Publishers, Inc. As indicated by the title, it follows cellulose from its vegetable sources through the laboratory research, which has determined its properties, into the industrial problems such as isolation and purification, derivative formations, and technical applications. It is a monumental work and the most complete treatise on the subject published to date. The list of contributors reads like a "Who's Who of the Cellulose Industry."

The book has been specially edited so that it can be read through from beginning to end without encountering material which presupposes for its understanding a knowledge of a topic discussed in a later section. This method has been followed closely, although, of necessity, it has not been possible to attain the objective in all cases. How carefully the material was put together is indicated by the chapter heads—10 in all—each containing numerous subdivisions, which follow:

(1) Occurrence of Cellulose; (2) Chemical Nature of Cellulose and Its Derivatives; (3) Structure and Properties of Cellulose Fibers; (4) Carbohydrates Normally Associated with Cellulose in Nature; (5) Lignin and Other Noncarbohydrates; (6) Preparation of Cellulose from Its Natural Sources; (7) Bleaching and Purification of Cellulose; (8) Derivatives of Cellulose; (9) Physical Properties of Cellulose and Its Derivatives; (10 Technical Applications of the Physical Properties of Cellulose and Its Derivatives.

Many excellent opportunities exist for fundamental research in the field of cellulose and this book should be a contributing factor to such developments. The book has a complete author index and a carefully cross-referenced subject index.

•

Chemical Engineering Catalog: 1943-44. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 8½ x 11 in. 1513 pp.

The latest edition of this catalog of the process industries—the twenty-eighth annual edition—has been completely revised and brought up-to-date. As in previous numbers, it contains an alphabetical list of firms represented, a trade name index, a section devoted to equipment and supplies (including manufacturers' catalogs), a section devoted to chemicals and raw materials (which also includes manufacturers' catalogs), and a technical and scientific books section. This latter section represents a complete bibliography of chemical technology. The manufacturers' catalogs included in this latest edition reflect the trend of the times, with a good deal of relatively new equipment illustrated and described.

•

Staybelite Esters. Synthetics Dept., Hercules Powder Co., Wilmington, Delaware. 8½ x 11 in. 12 pp.

Data on physical properties of the Staybelite esters—the glycerin, mono, di and tri-ethylene glycol esters of hydrogenated rosin—is given in this new booklet. Typical materials compatible with these esters, including various film-formers, resins, plasticizers, waxes and asphalt, are listed. Laboratory formulations for rubber base adhesives, lacquers, and modified urea-formaldehyde resins are also given. The Staybelite esters have shown promise as softeners and tackifiers for rubber, reclaimed rubber and latex; as modifiers and agents for transparentization of paper; as plasticizers and modifiers for ethyl cellulose, polyvinyl acetate chloride, and polyvinyl butyral; and as binders for rock wool, glass, and cellulose fibrous insulation material.

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Model B

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Model B

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BOOKLETS, CATALOGS, Etc.

Automobile Facts and Figures. (25th Edition). Published by the Automobile Manufacturers Association, New Center Building, Detroit, Mich. 6 x 8¾ in. 64 pp.

The rapidly increasing growth of war production achieved by the automotive industry—now nearly to the ten billion dollar a year stage—is charted in the latest edition of this annual yearbook. Graphically showing how the industry has stepped up its deliveries to the United Nations, the yearbook compares the annual rate of production achieved in the first month after Pearl Harbor ($1,984,000,000) with the annual rate of $9,500,000,000 achieved in the late summer of 1943. According to the yearbook, there are now 1038 automobile plants from coast to coast engaged in war work, of which 316 are in Michigan, 150 in Ohio, 98 in Illinois, 92 in New York, and 84 in Indiana. It also reveals that despite wartime restrictions, 24,406,000 passenger cars and 4,267,000 motor trucks are still being operated. Taxes on motor vehicles contributed $2,034,000,000 to state, federal and local revenues in 1942. A survey of employees in 94 war plants showed that 73% drove to work.

•

Salvage Manual for Industry. Published by Technical Service Section, Industrial Salvage Branch, Salvage Division, War Production Board, Washington, D. C. 5¾ x 9¼ in. 245 pp. 50c per copy. (Available from Superintendent of Documents, Washington, D. C.)

This is the first comprehensive practical manual on industrial salvage ever prepared. It contains systematically organized and classified information and data on industrial salvage practice in all of its ramifications. Material is presented in 26 chapters, grouped into six major sections. Information furnished by the book includes methods of organizing and planning the salvage department, administrative factors, methods of handling metal scrap and non-metallic waste, and hints for handling specific waste materials, including rubber. A number of case histories, demonstrating exemplary practice, are given. Although designed to speed victory, the manual is certain to have continued application in post-war industry because of its attention to the economic benefits of sound salvage practice.

•

Synthetic Rubber Data. Compiled and published by the Acadia Synthetic Products Division of Western Felt Works, 4115 Ogden Ave., Chicago 23, Ill. 8½ x 11 in.

The results of compound evaluation achieved in the company's laboratories are given in this handsome, loose-leaf booklet, designed primarily for the engineer who requires data on the properties of the various copolymers. The major portion of the data, presented in legible and efficient format, was developed from research instigated by problems of aeronautical engineers. Laboratory reports on a wide range of tests to determine resistance to oils, fuels and solvents are included. Various Army, Navy and A.M.S. specifications are also included.

•

GR-S-Guayule Blends (Report GR-S No. 4). Continental Carbon Co., 311 Peoples Bank Bldg., Akron, Ohio. 9 x 11½ in. 8 pp.

Physical results of the effects of 5, 10 and 20% guayule on GR-S stocks containing respectively 50 parts of Continental AA and 50 parts of Continental A carbon black are reported in this technical bulletin. The results indicate that the addition of about 5% guayule appears to improve tensile, resistance to heat aging, flex-cracking resistance, and ease of processing. Modulus and abrasion resistance are reduced, but other properties are unchanged. The results are given in text, table and chart form.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, Nov. 12, 1943

Crude Rubber

SOME interesting reports on the efforts of various government agencies to increase the flow of wild rubber from various countries of South America have been turned in by the group of newspaper men who recently toured rubber sources under the auspices of the Rubber Development Corporation. These reports have been appearing in metropolitan newspapers throughout the country for the past few weeks.

It is quite apparent from the reports that the newspaper writers were given every opportunity to secure accurate information on every phase of the rubber program since its initial launching in Latin America. They were permitted to talk to executives, river men, tappers, shippers, etc. And from all the various interviews they pieced together interesting reports.

In general, the reports were in agreement that South America cannot be depended upon to supply the normal world needs of rubber, primarily due to manpower shortages and the extreme difficulties of transporting the rubber. Each pound of rubber now coming out of the Amazon Valley was estimated to cost the Rubber Development Corporation over $100 per pound. No official figure was quoted, but estimates made to the writers ran from $50 to $500 per pound.

One of the "romantic" angles of the South American rubber program was rudely shattered by at least one of the reports, i. e., that rubber is being transported to the United States by air. According to this report, the story is 99% fiction and 1% fact, airplanes being used to transport rubber only when all other types of cargo are not available.

Prices shown below are those set by the Rubber Reserve Company:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X	22½	40
Thick Pale Latex Crepe, 1X	22½	40
Thin Pale Latex Crepe, 1X	22½	40
Thick Brown Crepe, 1X	21⅜	38⅞
Thin Brown Crepe, 1X	21⅜	38⅞
Thick Remilled Blankets, #1	21⅜	38⅞
Rolled Brown or Flat Bark	18	35½
Smoked Blankets, #1	21⅛	38⅜
Claro Brand 1XRSS	22⅛	40
Sole Crepe Trimmings	22	39½
Sole Crepe	22⅛	40
Wild—		
Uncut Fines, Crude	15	29
Cut Fines, Crude	15½	29¾
Cut Fines, Washed & Dried	22½	40
Upriver Coarse, Crude	12¾	26⅛
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11⅜	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17⅜	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¼	44¼
Centrifuged, Tank Car Lots	27¼	45¼
Heat-Concentrated, Carload Drums	29½	47

C, for Civilian Use; N-C, for Non-Civilian Use.

Scrap Rubber

Stocks of scrap rubber continue adequate and demands from reclaimers show no indication of slackening for months to come. Many dealers assert that still greater demand will be forthcoming in the near future when the use of reclaim is permitted in many types of products. There are also reports of an increasing flow of synthetic rubber scrap into regular trade channels and the industry is preparing methods to properly sort the river which is eventually expected. Agents for the Rubber Reserve Co. are still buying mixed tires at $10.00 per ton, passenger tires at $15.00 per ton, and inner tubes at $120.00 per ton. Demand also continues for airbrake hose scrap, which brings $25.00 per ton. Prices shown below are ceilings on typical grades of scrap.

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¾
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41
CHAFERS			
Carded, American, 1 1/16"	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36 in.	5.50	lb.	—	@ 7.818
40x40	36 in.	6.15	lb.	—	@ 6.991
40x36	36 in.	6.50	lb.	—	@ 6.615
48x48	40 in.	2.50	lb.	—	@16.200
48x48	40 in.	2.85	lb.	—	@14.210
56x60	40 in.	3.60	lb.	—	@11.944
48x44	40 in.	3.75	lb.	—	@11.066

Note: Prices shown above are ceiling prices set by order of the O.P.A. Quotations are based on an average price of 15-16-inch middling cotton of 20.37c at the ten designated southern markets.

Cotton

Middling uplands on the Cotton Exchange fluctuated within a range of 98 points since our last report (October 13), high for the period having been 21.09 on October 15 and low 20.11 on November 8. While the market recovered in two or three instances, the trend on the whole was consistently downward. The establishment of a ceiling price by the Cotton Exchange of 20.40 for October delivery had a depressing effect as it influenced mills to believe they could fill their requirements on a cheaper basis. The possibility of a heavy cancellation of military textile contracts in the event of the sudden termination of the European war also was reflected in the market to the extent that all future months beyond December sold under the theoretical loan level of 1925. As the major part of the crop is still in producers' hands, it is believed in the trade that most of this cotton will be lodged in government loans. The Cotton Exchange estimated today (November 12) that consumption of cotton in October was 855,000 bales, which compares with 872,000 bales in September and 973,000 bales in October of last year. The daily rate of disappearance was placed at 41,700 bales, against 39,300 bales a day in September and 44,700 bales a year ago. Quotations for middling uplands on the Exchange follow:

	Oct. 13	Nov. 12		
	Close	High	Low	Close
December	20.17	19.73	19.60	19.64
March	20.00	19.47	19.36	19.39
July		19.03	18.92	18.96

Reclaimed Rubber

The high production rate achieved by reclaimers in recent months is still being maintained, despite the ban on Victory tires of reclaim. Even the incorporation of GR-S in Grade C camelback, which resulted in a lessening of demand for whole tire reclaim, has failed to lower production programs. The industry feels certain that the use of reclaim will shortly be permitted in a number of rubber products and stocks should be adequate to meet the inevitable demand. Reclaimers are urging Washington to adopt a specific marking measure to indicate the use of synthetic rubber in mechanical goods, as is now being done with tires. Prices shown below are ceilings on typical grades of reclaim.

Shoe				
Unwashed	lb.	.07	@	.07¼
Tube				
Black Tube	lb.	.11¼	@	.11½
Red Tube	lb.	.12	@	.12¼
Tires				
Black (acid process)	lb.	.07½	@	.07¾
Black, selected tires	lb.	.06½	@	.06¾
Truck, Heavy Gravity	lb.	.08½	@	.08¾
Miscellaneous				
Mechanical blends	lb.	.04½	@	.05½
White	lb.	.13	@	.13¼

Ducks

Enameling (single filling)	lb.	—	@	.44¼
Belting and Hose	lb.	—	@	.39
Single filling, A grade	lb.	—	@	.19¼
Double filling, A grade	lb.	—	@	.20¼

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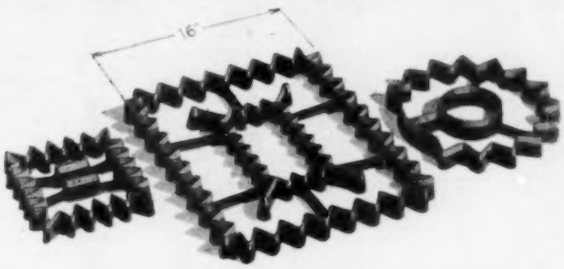

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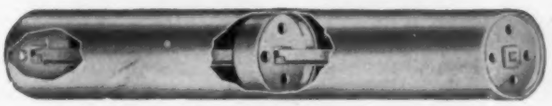

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A-19	lb.	.52 @	.65
A-32	lb.	.60 @	.70
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.43 @	.45
Beutene	lb.	.59 @	.64
B-J-F	lb.	.38 @	.43
Butasan	lb.	— @	1.13
Butyl Zimate	lb.	— @	1.13
Captax	lb.	.38 @	.40
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.36
El-Sixty	lb.	.40 @	.47
Ethasan	lb.	— @	1.13
Ethyl Zimate	lb.	— @	1.13
Ethylidine aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantai	lb.	.39 @	.48
Hepteen	lb.	.34 @	.39
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Ledate	lb.	— @	1.48
Methasan	lb.	— @	1.23
Methyl Tuads	lb.	— @	1.53
Methyl Zimate	lb.	— @	1.23
Monex	lb.	— @	1.53
Pentex	lb.	.74 @	.84
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.63
R & R 50-D	lb.	.42 @	.43
R-2 Crystals	lb.	— @	1.55
Rotax	lb.	.48 @	.50
Safex	lb.	1.15 @	1.25
Santocure	lb.	.60 @	.67
Selenac	lb.	— @	1.98
SPDX	lb.	.70 @	.75
Super-Sulfur No. 2	lb.	.13 @	.15
Thiocarbanilid, drums	lb.	.28 @	.33
Thiofide	lb.	.43 @	.50
Thiotax	lb.	.38 @	.45
Thiurad	lb.	— @	1.53
Trimene	lb.	.54 @	.64
base	lb.	1.03 @	1.18
Triphenylguanidine	lb.	.45 @	—
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.50 @	.57
Blend B	lb.	.50 @	.57
Blend C	lb.	.48 @	.55
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—

Inorganic

Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blues [b]			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.17 @	.27
Browns [b]			
Mapico	lb.	.1135@	—
Umber, Turkey	lb.	.04¼@	—
Greens [b]			
Chrome	lb.	— @	.25
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¾@	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.096 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¾@	—
Whites [b]			
Cryptone No. 19	lb.	.0560@	.0585
Cryptone CB No. 21	lb.	.0560@	.0585
Cryptone ZS-800	lb.	.0825@	.0850
Lithopone:			
Albalith	lb.	.04¼@	.04½
Astrolith	lb.	.04¼@	.04½
Azolith	lb.	.04¼@	.04½
Ray-cal	lb.	.05½@	.05¾
Rayox	lb.	.14½@	.15¾
Titanox A	lb.	.14½@	.14¾
Titanox B	lb.	.05¾@	.06
Titanox C	lb.	.05½@	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼@	.07½
Anaconda, lead free	lb.	.07¼@	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼@	.07½
XX Red—4	lb.	.07¼@	.07½
XX Red—72	lb.	.07¼@	.07½
XX Red—103	lb.	.07¼@	.07½
Kadox, black label—15	lb.	.07¼@	.07½
Red label—17	lb.	.07¼@	.07½
St. Joe, black label	lb.	.07¼@	.07½
green label	lb.	.07¼@	.07½
red label	lb.	.07¼@	.07½
U. S. P.—7, bbls.	lb.	.10½@	.10¾

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½@	.09¾
Green seal—8	lb.	.09 @	.09¼
Red seal—9	lb.	.08½@	.08¾
Yellows [b]			
Cadmolith	lb.	.55 @	.60
Chrome	lb.	— @	.50
Mapico	lb.	.071 @	—

BLACKS

(In bags, carload lots)

Aerfloted Arrow	.0355@		—
Atlantic	.0355@		—
Certified	.0355@		—
Certified Spheron	.0355@		—
Channel "S"	.12 @		—
Continental	.0355@		—
Disperso	.0355@		—
Dixiedensed	.0355@		—
Dixiedensed 66	.0355@		—
Excello	.0355@		—
Furnex	.03½@		.06
Furnex Beads	.03½@		.06
Gastex	.03½@		.06
Kosmobile	.0355@		—
Kosmobile 66	.0355@		—
Kosmos-Dixie 20	lb. .03½@		.06
Micronex (Amarillo)	.0355@		—
Micronex Beads (Amarillo)	.0355@		—
Pelletex	.03½@		.06
P-33	.0475@		—
Shell Carbon (Del. Midwest)	.0240@		—
Sterling	.035 @		—
Supreme	.0355@		—
Thermax	.0225@		—
Thermax "S"	.0675@		—
Wyex	.0355@		—

COMPOUNDING MATERIALS

Aluminum Flake	ton 18.00	@24.50	
99½%-300	ton —	@16.50	
86-90%-300	ton —	@13.50	
Asbestine	ton 16.50	@20.00	
Atomite	ton —	@27.50	
Barium carbonate (98-100%)	ton 47.00	@49.00	
Barytes	ton 25.35	@36.00	
Bentonite	ton 11.00	@16.00	
Blanc fixe, dry	ton 60.00	@67.50	
Calcene	ton 37.50	@43.00	
Catalpo (fact)	lb. .02	@ —	
Chalk, precipitated			
Suprex white	ton 32.50	@45.00	
Clay, Aerfloted, Suprex	ton 10.00	@22.50	
Aerfloted Paragon	ton 10.00	@22.50	
Crown	ton 10.00	@ —	
Dixie	ton —	@10.00	
Kaolloid	ton —	@ 9.00	
Langford	ton —	@ 8.50	
McNamee	ton —	@10.00	
Par	ton —	@10.00	
Witco	ton 10.00	@ —	
Kalite No. 1	ton —	@26.00	
Kalite No. 3	ton —	@36.00	
Kalvan	ton —	@100.00	
Kalvan "S"	lb. —	@ .09½	
Keystone white	ton —	@14.00	
Magnesium carbonate	lb. .06¼	@ —	
Mineralite	ton —	@30.00	
Pyrax A	ton —	@ 7.50	
Rottenstone (powd. Dom.)	ton 25.50	@37.50	
Rubberol	lb. —	@ .17½	
Silene EF (calcium silicate)	lb. .055	@ .06	
Snowflake white	ton —	@16.00	
Talc, domestic	ton 17.00	@25.00	
Whiting, commercial	ton 16.00	@26.00	
Witco	ton 6.00	@ —	
Witcal	ton —	@100.00	
Witcarb R-12	ton —	@40.00	
Wood Flour (100 mesh)	ton 30.00	@32.00	

MINERAL RUBBER

285°-300° Mineral Rubber	ton 25.00	@	—
Black Diamond	ton 25.00	@	—
Hard Hydrocarbon	ton 25.00	@27.00	
MilliMar	lb. —	@ .05½	

MISCELLANEOUS

Aromatics—Rodo #0	lb. 4.00	@ 4.50	
Rodo #10	lb. 5.00	@ 5.50	
Curodex 19	lb. 2.75	@ —	
Curodex 188	lb. 3.50	@ —	
Curodex 198	lb. 4.50	@ —	
Para-Dors	lb. 4.50	@ —	
Aresklene No. 375	lb. .35	@ .50	
Darvan (dispersing agent)	lb. .30	@ .34	
Santomerse S	lb. .11	@ .25	
Sponge Paste	lb. —	@ .18	
Sunproof	lb. .22¾	@ .27¾	
Tonox	lb. .50	@ .59	
Ty-Ply	gal. 6.75	@ 8.00	
Unicel (blowing agent)	lb. .50	@ —	

SOFTENERS

Acids			
Acetic, 28%, bbls.[a]	100 lb. 3.38	@ 3.63	
Nitric, 36 degrees	cwt. 5.00	@ —	
Acids, Fatty			
Laurex	lb. .14¾	@ .17¾	
SL #10	lb. .12	@ .14	
Stearex Beads	lb. .10	@ .11	
Stearite	lb. .10	@ —	

Alkalies			
Caustic Soda, 76%	cwt. 2.70	@ 5.70	
Soda Ash, 58%	cwt. 1.15	@ 2.98	
Oils			
Degras, bbls.	lb. .10	@ .12	
Para-Flux	gal. .17	@ .18	
Para-Lube	lb. .046	@ .048	
Petrolatum, amber [b]	lb. .03¾	@ —	
Pigmentaroil, tank cars	gal. .20½	@ —	
in drums	gal. .26½	@ .27½	
Pine, tanks	gal. .55	@ —	
Rosin Oil, cmpd.	gal. .40	@ —	
Rubberol	lb. .13½	@ .14	
Rubtack	lb. .10	@ —	
Seedine, c.l.	lb. .07¼	@ —	
Witco Palm Oil	lb. —	@ —	
Witco Softener No. 20	gal. .20	@ —	
Woburn No. 8, c.l.	lb. .06	@ —	
Resins and Pitches			
Pitch, Burgundy	lb. .06	@ —	
coal tar	ton 19.00	@22.00	
hardwood	ton 16.00	@22.50	
pine, 200 lb. gr. wt.	bbl. —	@ 4.50	
Pigmentar, tank cars	gal. .20½	@ —	
in drums	gal. .26½	@ .27½	
Retort Pine Tar, drums	gal. .26½	@ .27½	
Solvents			
Acetone, pure [a]	lb. .07	@ —	
Benzene, 90%, tank car	gal. .14	@ —	
Beta-Trichlorethane	gal. —	@ .20	
Bondogen	lb. .98	@ 1.05	
Carbon, bisulfide	lb. .05	@ .08½	
Carbon tetrachloride	gal. .83	@ 1.27	
Dichlorethylene	lb. —	@ —	
Dipentene, cml., drums	gal. .48	@ .50	
Ethylene dichloride	lb. .07½	@ .08½	
Plastogen	lb. .07¾	@ .08	
Reogen (drums)	lb. .11½	@ .12	
Rub-Sol	gal. .09½	@ —	
Trichlorethylene	lb. .08	@ .09½	
Turpentine, spirits	lb. .78½	@ —	
dest. dist., drums	gal. .50	@ .55	
Waxes			
Beeswax, white [b]	lb. .58	@ —	
Carnauba, yellow [b]	lb. .83¼	@ —	
Ceresin, white, dom.	lb. .13½	@ .15	
Montan, crude	lb. —	@ —	
Paraffin [a]			
Yellow crude scale, 124/126	lb. .04¼	@ —	
Refined, 123/125	lb. .05¼	@ —	

ANTI-OXIDANTS

Agerite Alba	lb. 1.95	@ 2.05	
Gel	lb. .52	@ .54	
Hipar	lb. .61	@ .63	
Powder	lb. .43	@ .45	
Resin	lb. .43	@ .45	
Resin D	lb. .43	@ .45	
White	lb. 1.23	@ 1.33	
Albasan	lb. .69	@ .74	
Antox	lb. .54	@ .56	
B-L-E	lb. .43	@ .52	
Flectol H	lb. .43	@ .55	
Flectol White	lb. .89	@ 1.00	
Neozone A, B, C, D, E	lb. .43	@ .63	
Oxynone	lb. .77	@ .90	
Retardex	lb. .45	@ .48	
Santoflex B	lb. .43	@ .55	
Santoflex BX	lb. .56	@ .64	
Santovar O	lb. 1.15	@ 1.40	
S.C.R.	lb. .33	@ .35	
Stabilite	lb. .52	@ .54	
Stabilite Alba	lb. .70	@ .75	
VGB	lb. .43	@ .52	

EXTENDERS

Naftolen	lb. .15	@ .20	
Vanzak	gal. .05	@ .06	

LUBRICANTS—MOLD & RUBBER SURFACE

Aresklene	lb. .35	@ .50	
Cocoa Soapstock	lb. .06	@ .08	
Colite	gal. .90	@ 1.15	
Dipex	lb. .06	@ .08	
Glycerized Liquid Lubricant	gal. —	@ 1.35	
Lubrex	lb. .25	@ .30	
Mineralite	ton —	@30.00	
Sericite	ton 65.00	@75.00	
Soap Tree Bark, cut, sifted	lb. .06	@ .08	

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb. .25	@ —	
Amberex Type B	lb. .18¾	@ —	
Black	lb. .08½	@ .13	
White	lb. .09	@ .15	
Brown	lb. .10	@ .14	
Neophax A	lb. .16½	@ —	

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb. .08	@ .12	
Sulfur Chloride, yellow (drs.)	lb. .03	@ .08	
Sulfur, rubber makers			
Refined (bags)	cwt. 2.55	@ —	
Commercial (bags)	cwt. 2.20	@ —	
Telloy	lb. 1.75	@ —	
Vandex	lb. 1.75	@ —	

NEOPRENE COMPOUNDERS!

investigate **Baker's**
CALCINED MAGNESIA

Baker supplies what neoprene compounders demand—Calcined Magnesia that is always uniform.

Test it in wetting power—in ease of dispersion—stability of compounded stock—rate of cure—tensile strength and plasticity.

Learn why Baker's Light Calcined Magnesia is better.

Send for free samples

J. T. BAKER CHEMICAL CO.
Phillipsburg, New Jersey

REVERTEX CORPORATION OF AMERICA
37-08 Northern Boulevard
Long Island City 1, N. Y.

Agents of Rubber Reserve Co.
Washington, D. C.
for

REVERTEX (73 - 75%)
60% LATEX
NORMAL LATEX

We will compound the Latex allocated to you for war uses and permitted civilian uses to suit your special requirements.

COMPOUNDS FROM SYNTHETIC LATICES

We maintain a fully equipped laboratory and free consulting service.

GRANULATED CORK
FOR EXTENDING RUBBER
SOUTHLAND CORK COMPANY
P. O. BOX 868 NORFOLK, VA.

COLORS for RUBBER
Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides
•
Reinforcing Fillers and Inerts
C. K. WILLIAMS & CO.
EASTON, PA.

AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
NATIONAL SHERARDIZING & MACHINE CO.
868 Windsor St. Hartford, Conn.
Representatives: Akron San Francisco New York

SINCE 1880 **RUBBER GOODS**
Rand. REG. U. S. PAT. OFF.
"They Last Longer" REG. U. S. PAT. OFF.
DRESS SHIELDS
DRESS SHIELD LININGS
BABY PANTS
BABY BIBS & APRONS
SANITARY WEAR
RUBBERIZED SHEETING
RUBBER APRONS
STOCKINET SHEETS
RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
DOLL PANTS, CAPES, ETC.
RUBBER DAM & BANDAGES — SHEET GUM
RAND RUBBER CO. BROOKLYN, N.Y. U.S.A. MFRS.

BEACON
PALMALENE
A synthetic fatty acid for the rubber industry
Specifications: Saponification No. 180-185; Iodine Value, 55-60; Titre, 35.
THE BEACON COMPANY
97 Bickford St., Boston, Mass.
In Canada: Prescott & Company Reg'd., 774 St. Paul St. W., Montreal

RMP
for RED RUBBER
ANTIMONY
• ATTRACTIVE
• NON-DETERIORATING
RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

ONE THING FOR SALE ...THREE FOLKS TO BUY
AND SO THE PRICE GOES UP SKYHIGH!
WITH PRICES HIGH YOU WANT A RAISE -
THAT STARTS A GREATER SPENDING CRAZE!
UP
UP
UP
UP
UP
THIS CRAZY WHIRL IS CALLED INFLATION
AND IT ALONE CAN WRECK A NATION!
LET'S ALL STOP PRICES GOING HIGHER
BE A SAVER - NOT A BUYER!

Seven things you should do:

1. Buy only what you really need	**2.** Pay no more than ceiling prices... buy rationed goods only with stamps	**3.** Pay off old debts and avoid making new ones	**4.** Support higher taxes ...pay them willingly	**5.** Provide for the future with adequate life insurance and savings	**6.** Don't ask more money for goods you sell or work you do	**7.** Buy all the War Bonds you can afford – and keep them

Keep prices down...use it up, wear it out, make it do, or do without

This advertisement, prepared by the War Advertising Council, is contributed by this magazine in cooperation with the Magazine Publishers of America.

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York 19, N. Y.

Chemicals and Compounding Materials

ACCELERATORS—
El-Sixty; Ureka; Ureka C; Guantal; Santocure; DPG; Pip Pip; A-10; A-32; A-46; A-100; R-2 Crystals • ANTIOXIDANTS—Flectol H, White; Santoflex B, BX; Santovar O.
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

CARBON BLACK
A Grade for Every Requirement
CONTINENTAL "AAA"—Low heat generating, extremely easy processing. "AA"—Low heat generating, easy processing. "A"—Medium cure, medium processing. "D"—Standard Channel Black.
Continental Carbon Company
295 Madison Ave., New York, N. Y.

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

CARBON BLACK—Aerfloted
WYEX — TX — HX
Compressed — Compact (Dustless)
J. M. Huber, Inc.
460 West 34th St. New York

CHEMICALS

For Rubber		For Industry Generally
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 SIXTH AVE. NEW YORK

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 40 years.*
The Aluminum Flake Co.
Akron, Ohio

CARBON BLACK
"Atlantic" Carbon Blacks meet the exacting standards of modern rubber production.
Chas. Eneu Johnson & Co., Mfrs.
Distributed by
C. P. HALL CO.
Akron — Boston — Los Angeles — Chicago

CHEMICALS
For Natural & Synthetic Rubber
"PICCO" Brand—Plasticizers; Coumarone Resins; Reclaiming Oils, Coal Tar Naphthas.
Pennsylvania Industrial Chem. Corp.
Clairton Penna.

ALUMINUM HYDRATES
"Alorco" Hydrated Aluminas reinforcing pigments give many desirable properties to rubber. Send for sample.
ALUMINUM CO. OF AMERICA
1970 Gulf Bldg. Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CHEMICALS
A complete line of plasticizers, resins, substitutes, fillers, etc., for Synthetic, Natural and Reclaimed Rubber.
STANDARD CHEMICAL COMPANY
Akron Savings & Loan Bldg, Akron

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
Wishnick-Tumpeer, Inc.
295 Madison Ave., New York, N.Y.

CHEMICALS AND MINERAL
Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

CALCENE—SILENE EF
Two exclusive Columbia pigments proving exceptionally valuable to Rubber Compounders. Send for free data sheets.
PITTSBURGH PLATE GLASS CO.
COLUMBIA CHEMICAL DIV.
Grant Bldg., Pittsburgh (19), Pa.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street New York City

COAL TAR CHEMICALS

Coumarone Resins	Tack Producers
Resinous Oils	Dispersing Oils
Reclaiming Oils	Softeners
Solvents	

The Neville Company
Neville Island, Pittsburgh, Penna.

CARBON BLACK-MICRONEX
The world's standard gas black; universally known as the "King of Rubber Pigments."
BINNEY & SMITH CO.
41 East 42nd St. New York City

Do you believe in Your Products?
Then you should believe in telling the rubber industry about them. The MARKET PLACE is the logical place to display your wares.

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Melrose, Mass.
Offices in New York, Akron, Chicago

The Market Place

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Chemicals and Compounding Materials (continued)

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

GASTEX
Special Process Reinforcing BLACK. Superior aging and oil resistant properties. Low permanent set.
Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
General Atlas Carbon Div.,
General Properties Co., Inc., Pampa, Texas

PARA-DORS—
overcome odors in rubber—effectively and at low cost.
GIVAUDAN-DELAWANNA, INC.
Industrial Aromatics Division
330 West 42nd St., New York, N. Y.

COMPOUNDING Materials
Vulcanizing Agents — Pigments
Accelerators — Clays
Antioxidants — Mineral Rubber
Plasticizers — Aromatics
Dispersions — Blacks
R. T. VANDERBILT CO.
230 Park Ave. New York City

IRON OXIDES
Asbestine—Barytes—Talc—Soapstone
C. K. Williams & Co.
EASTON, PA.

PARA-FLUX
The Universal Softener—Adaptable, Uniform. Improves Quality—Economical.
The C. P. Hall Co.
2510 First Central Tower
Akron Ohio

CUMAR —Paracoumarone Resin.
A neutral gum for rubber compounding.
Samples and prices on request.
The Barrett Div.
Allied Chemical & Dye Corp.
40 Rector St. New York City

LAMP BLACKS
Produced according to the rigid specifications of the makers of EAGLE and OLD STANDARD Germantown Brands.
THE L. MARTIN COMPANY, Inc.
Unit of Columbian Carbon Co.
BINNEY & SMITH CO.
Distributor of Rubber Blacks
41 East 42nd Street New York, N. Y.

PELLETEX (The pellet *Gastex*)
The special process reinforcing black in free-flowing form. Saves power; none wasted; protects adjacent colored stocks.
Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
General Atlas Carbon Div.,
General Properties Co., Inc., Pampa, Texas

DU PONT Rubber Chemicals
DU PONT RUBBER COLORS
DU PONT ACCELERATORS
DU PONT ANTI-OXIDANTS
E. I. du Pont de Nemours & Co., Inc.
RUBBER CHEMICALS DIVISION
WILMINGTON, DELAWARE

MAGNESIUM OXIDE
Calcined Magnesium Oxide prepared for use in the compounding of neoprene. Full details on request.
J. T. Baker Chemical Co.
Phillipsburg New Jersey

RUBBER PROCESSING OILS
For outstanding compatibility in processing natural or modern synthetic rubbers, use
SUN RUBBER PROCESSING OILS
Write
SUN OIL COMPANY
Philadelphia Pennsylvania

EXTENDER
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("Help Wanted" Continued Next Column)

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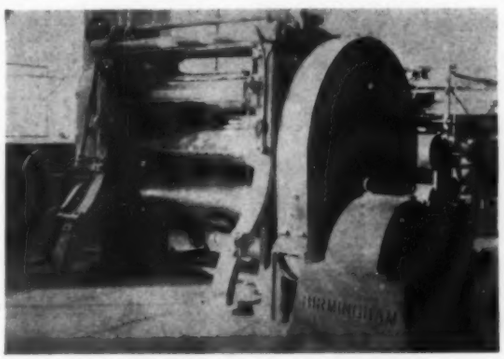

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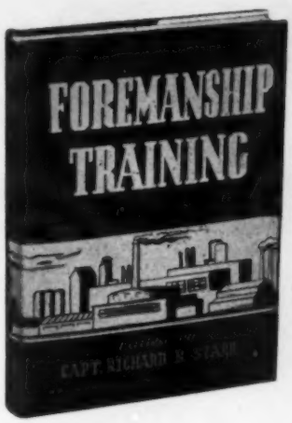

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, and MARCH 3, 1933, of THE RUBBER AGE, published monthly at East Stroudsburg, Pa., for October 1, 1943.

State of New York }
County of New York } ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Peter P. Pinto, who, having been duly sworn according to law, deposes and says that he is the Business Manager of The Rubber Age and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers, are:

Publisher, Palmerton Publishing Company, Inc., 250 W. 57th St., New York 19, N. Y.; Editor, M. E. Lerner, 250 W. 57th St., New York 19, N. Y.; Managing Editor, None; Business Manager, Peter P. Pinto, 250 W. 57th St., New York 19, N. Y.

2. That the owner is (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given):

Palmerton Publishing Company, Inc., 250 W. 57th St., New York 19, N. Y.; P. L. Palmerton, 250 W. 57th St., New York 19, N. Y.; Earl D. Osborn, 40 E. 36th St., New York 16, N. Y.; Peter P. Pinto, 250 W. 57th St., New York 19, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holders appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stocks, bonds, or other securities than as so stated by him.

PETER P. PINTO, Business Manager.

Sworn to and subscribed before me this 22nd day of September, 1943.
[SEAL] HANNAH GOLDENSON, Notary Public.
(My commission expires March 30th, 1944.)

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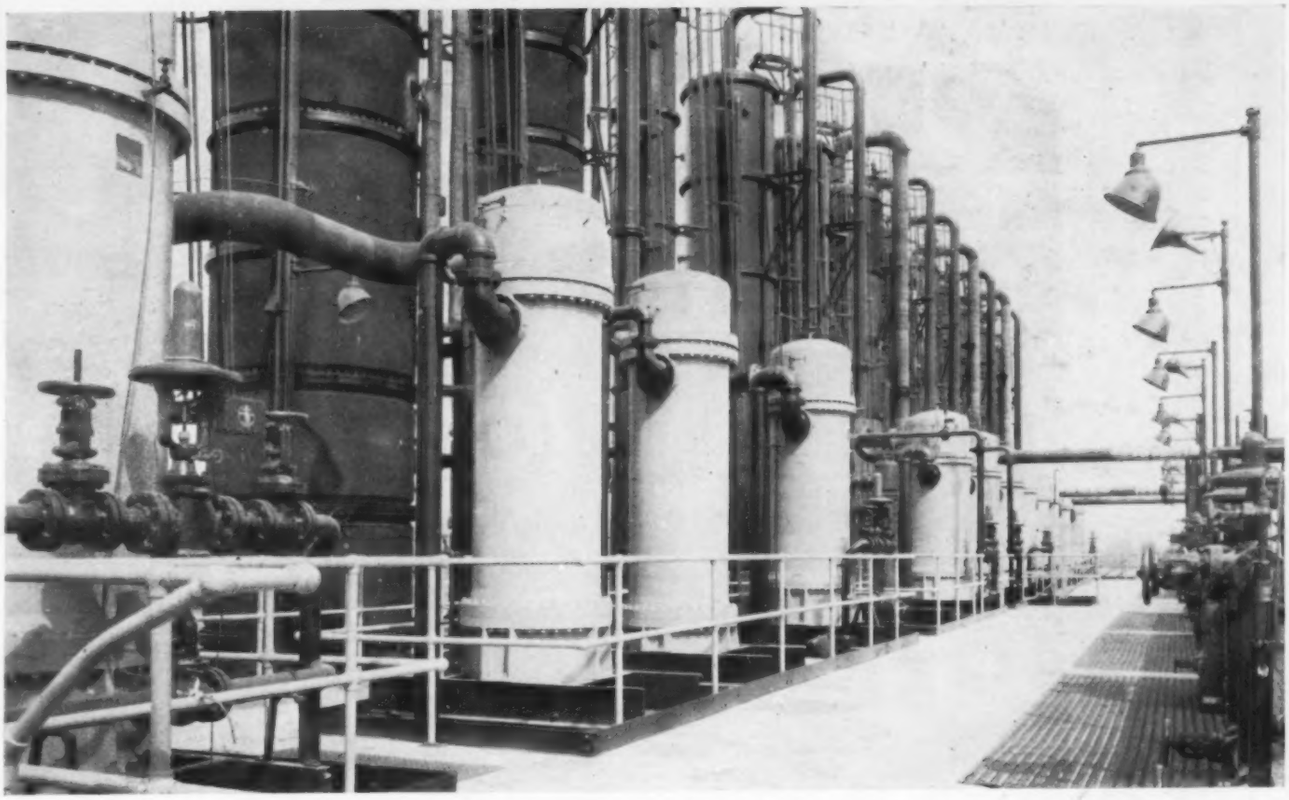

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